Dental Abstracts

a selection of world dental literature

AMERICAN DENTAL ASSOCIATION

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AMERICAN DENTAL ASSOCIATION

Sections

Armamentarium *page* 451
Oral surgery *page* 454
Periodontics and endodontics *page* 466
Preventive and public health dentistry *page* 469
Orthodontics and pedodontics *page* 480
Basic science *page* 485
Prosthetic dentistry *page* 497
Operative dentistry *page* 500
Professional activities *page* 502

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2. To provide, by a few hours' reading each month, a survey of the significant advances being made by dentistry throughout the world, as reflected in current dental literature; and

3. To supply enough data in each abstract so that the reader may determine whether he wishes to refer to the original article for more complete information.

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Armamentarium

▼

Appliances

A new type of removable splint: its indication and function

(La ferula rimovible di Weissenfluh: sua efficacia funzionale e indicazioni)

Carlo Zerosi. *Clin.odontoprotes.* 2:279-293 Oct.-Dec. 1955

A new type of removable splint that may be used for the fixation of loose teeth in instances of periodontal disease, especially periodontosis, has been tested at the Dental Clinic of the University of Pavia, Italy.

This apparatus consists of two main parts: (1) two or more platinized gold tubules, cemented in holes which have been prepared in the teeth, and (2) a removable splint containing two or more stainless steel (or gold) pins which fit into the tubules and can be removed easily by the patient.

Vertical holes are drilled, 3 mm. deep, into the lingual surface of anterior teeth or the occlusal surface of posterior teeth. Previously taken roentgenograms will reveal the correct position for the holes so that pulp injury can be avoided.

The openings of the tubules are slightly enlarged in order to facilitate the insertion of the pins.

The tubules are 3 mm. long, their external diameter is 1 mm., and their internal diameter, 0.8 mm.

One tubule will be sufficient for each anterior tooth, but two tubules should be inserted in posterior teeth—one on the mesioocclusal and the other on the distoocclusal surface.

The splint may touch the lingual surface of the anterior teeth but should not reach the incisal edges. In the posterior portion, the removable part of the apparatus is hook-shaped and fastened to the occlusal surfaces of bicuspids or molars with clasps.

The pins, which are inserted in the tubules, are attached firmly to the removable part of the appliance. After insertion, the apparatus must be wholly concealed by the teeth.

The removable part of the splint and all attachments then are soldered to form a single unit.

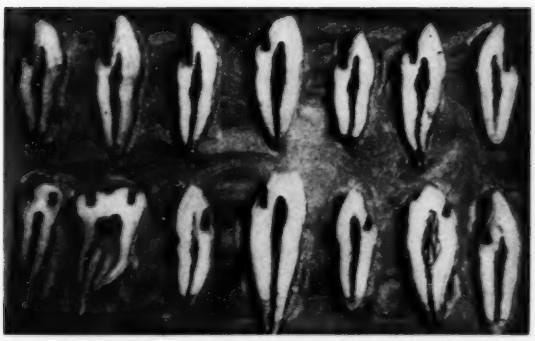
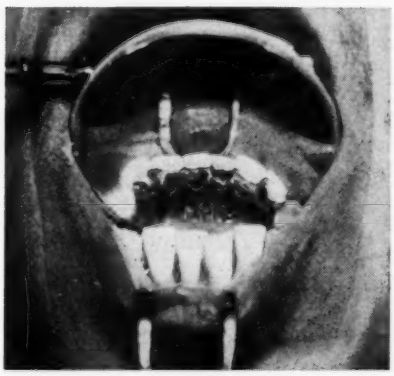


Figure 1 Location for holes in which the tubules are inserted in anterior and posterior teeth

Figure 2 Inserted appliance completely concealed from view



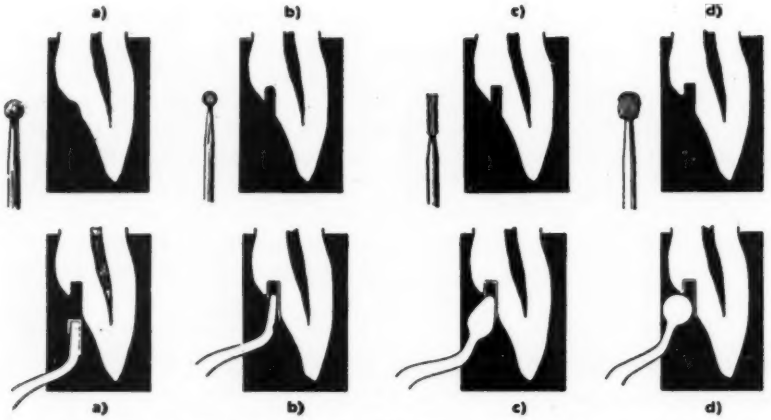


Figure 3 Above: Burs used for drilling the holes. Below: Instruments used for inserting the tubules

No additional preparation of the teeth will be necessary after the holes have been drilled and the tubules inserted and cemented.

This type of appliance should be used in upper anterior teeth only when a favorable condition exists. In lower anterior teeth, however, the apparatus can be used without restriction. A favorable occlusion also is required if it is used in posterior teeth. The tubules must be parallel to each other, so the patient can remove or insert the removable part easily. To obtain exactness in this relationship, a parallelometer should be used.

After the removable part of the appliance is constructed and the tubules inserted, a hydrocolloid impression is taken of the lingual surfaces of the anterior teeth, and of the lingual and occlusal surfaces of the posterior teeth.

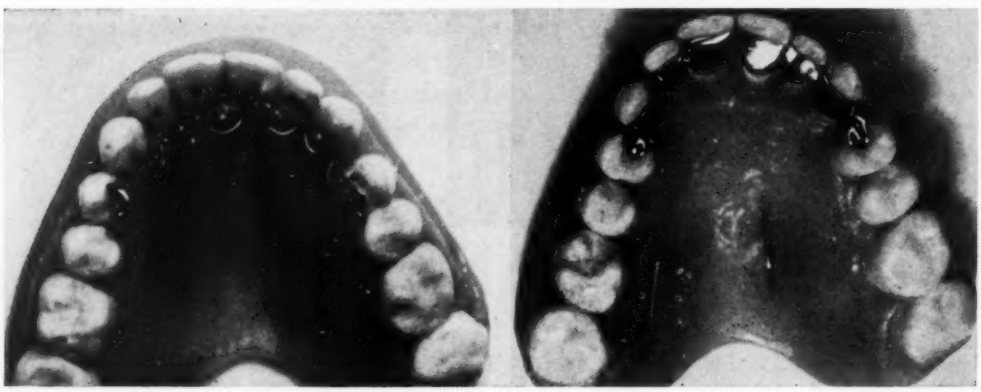
The pins then are inserted into the tubules, fastened to the removable part with wax, and the apparatus is cast as a unit.

This appliance adheres perfectly to the tooth surface, and the pins, inserted in the tubules, assure tooth stability and immobilization.

The patient should be advised to remove the apparatus at least once a day for cleansing. Removal at night also is recommended.

This type of apparatus has been found to be superior to other types of fixed or removable splints. When correctly applied, no irritation, inflammation or injury to the tissues occurs.

Figure 4 Left: Appliance ready for insertion. Right: Appliance after insertion



▼ Therapeutics

Tronothane in primary gingivostomatitis

Lewis H. Lambert and Otis Field Jillson.
New England J.Med. 254:756-757 April 19, 1956

Primary herpetic gingivostomatitis can be a debilitating disease. The painful oral lesions, which may last from 8 to 14 days, may interfere with eating and drinking so that parenteral fluid therapy is necessary. Whereas there appear to be some contraindications to the liberal use of the "caine derivatives" for symptomatic relief of this disease, in a recent case study pramoxine hydrochloride (Tronothane) was found effective and without evidence of toxicity or sensitization. The Tzanck procedure, wherein material is scraped from the floor of a lesion, placed on a slide and stained with the Giemsa technic, is an easy, reliable method of confirming the diagnosis.

A 34 year old woman with a past history of recurrent herpes simplex had a severe recurrence of this disease. The patient's 10 year old daughter acquired a stomatitis associated with fever and cervical lymphadenopathy, which was later proved by the Tzanck procedure to be primary herpetic gingivostomatitis. Within the next week two younger children in the family manifested the same disease, with oral lesions so painful that nutrition and hydration were impaired and parenteral fluid therapy was considered.

For topical anesthesia 1 per cent aqueous pramoxine hydrochloride was applied liberally by a cotton swab to the involved regions. This treatment produced immediate relief, allowing the children to eat and drink with reasonable comfort. The local anesthesia lasted about two hours.

Throughout the course of the disease the pramoxine hydrochloride was applied topically to the lesions before meals and at bedtime, with the same symptomatic relief.

Pramoxine hydrochloride differs structurally from all other available topical anesthetics. It contains an ether linkage and morpholine radical, both of which differentiate it from other local anesthetic agents and thus reduce the likelihood of cross-sensitization. Toxicity, as evidenced by animal studies and clinical observations, is extremely low. Primary sensitization appears to be negligible.

Although this drug appears to have a wide margin of safety, it should be prescribed in limited quantity because of its newness and the possible indiscriminate use by well-meaning parents for this disease.

Objective evaluation of therapeutic effects of medicated tooth pastes in gingivitis

(Objektive Erfassung der gingivo-therapeutischen Wirkung einer Zahnpaste)

Christina Hirt and Hans R. Mühlemann.
Parodontol.,Zürich 10:44-52 March 1956

The therapeutic effects of vitamin-medicated tooth pastes were tested on 102 patients afflicted with different forms of gingivitis. As control procedure a tooth paste containing a placebo was used.

One tooth paste contained vitamin A, the other vitamin D.

Changes in the gingival condition were measured by three methods: (1) routine clinical diagnosis; (2) PMA index, and (3) comparison of color photofluorograms. The tests were made before and after a two month period of observation.

No changes in the gingival condition were observed in routine clinical diagnosis. The PMA index and the comparison of color photofluorograms revealed a slight improvement in the gingival condition. The administration of the tooth paste containing the placebo, however, was followed by a similar decrease of symptoms.

The results, obtained by an objective evaluation of therapeutic effects of both medicated tooth pastes, disproved the claims made by the manufacturers. No curative effect or essential improvement was observed.

The sensitivity and correctness of the three methods utilized in this investigation, however, have been established. All three methods combined should be used in further similar tests.

Oral surgery

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Surgical technics

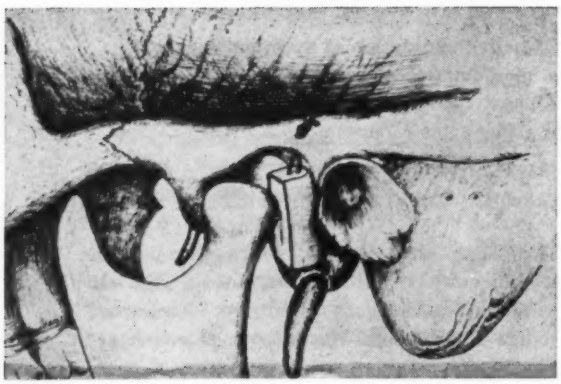

Figure 1 Oral surgery in distoclusion (Trauner's technic)

Oral surgery in distoclusion and in microgenia (Die Operation beim Distalbiss und der Mikrogenie)

R. Trauner, Graz, Austria, and F. Čelešnik, Ljubljana, Yugoslavia. *Fortschr.Kief.Ges.Chir.* 1:211-219, 1955

Distoclusion, a malposition of both dental arches in which the lower jaw is usually displaced in a posterior direction, can be treated successfully by orthodontic methods.

If this condition has been present for a long time, however, a correction by surgical methods is necessary. The recommended method (Trauner's technic) consists in the implantation of small parts of the costal cartilage into the anterior wall between the osseous acoustic duct and the temporomandibular joint. If the distoclusion is severe, an immediate shifting of the mandibular midsection to a more anterior position should be undertaken after osteotomy of the horizontal mandibular rami (Pichler, Kazanjian) or of the ascending rami. Horizontal osteotomy of the ascending rami (Kostecka, Lindemann) is contraindicated.

In microgenia, an abnormal smallness of the chin, the mandible is underdeveloped symmetrically or asymmetrically. This condition probably is caused by ankylosis of the temporomandibular joint, trauma or osteomyelitis (occurring during infancy).

If microgenia is severe, complicated surgical methods are used, and osseous material is transplanted into the horizontal and the ascending rami of the mandible. In the chin, however, pieces of plastic resin are implanted because osseous structures often shrink or decompose easily after transplantation. In the maxillary process, autogenous bony parts should be implanted. In the horizontal ramus, the mandibular nerve should be severed at the place of entry with an L-shaped incision. In extreme instances of underdeveloped chin, an implantation of osseous material will not be sufficient, and a buccal inlay, connected to a prosthesis (Thiersch's graft method), is placed in the oral vestibule. The more lingually positioned teeth are provided with telescope crowns, and all anterior teeth replaced by artificial teeth in correct position to permit perfect occlusion.

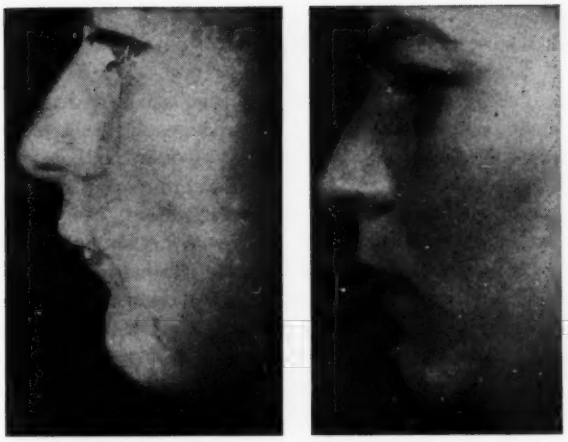

Figure 2 Left: Distoclusion before operation. Right: After operation

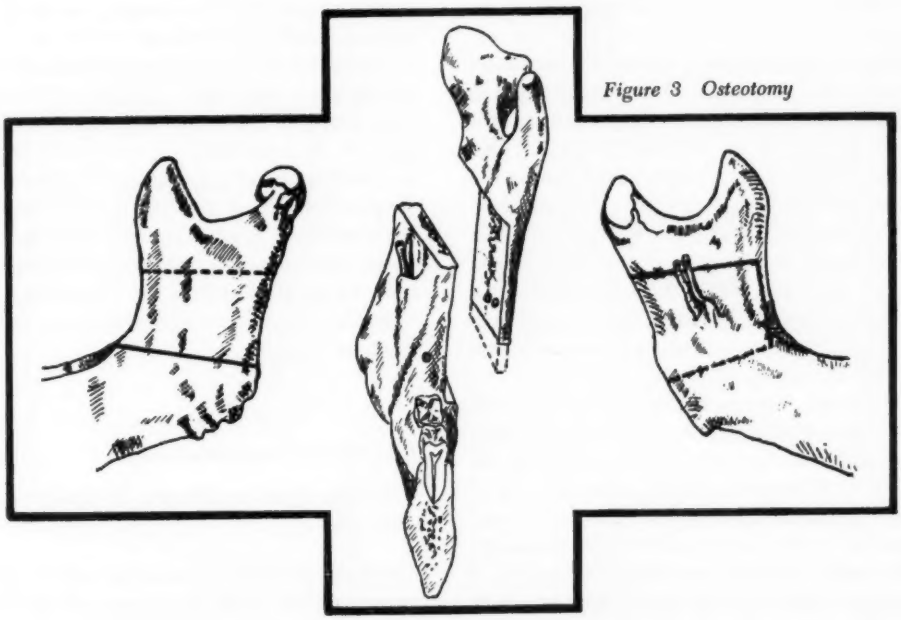

Figure 3 Osteotomy

Figure 4 Left: Microgenia before operation. Right: After operation

Sialolithiasis

Milton S. Travin. *New York D.J.* 21:512-516 Dec. 1955

In 1941 the patient noticed a painless swelling below the right side of his face, which subsided and recurred several times and then disappeared. In 1947 the swelling returned and became intermittent, with discomfort. In 1948 the patient noticed that the swellings occurred at mealtimes and that the discomfort originated from the tip of the tongue. The patient consulted a physician who administered a series of penicillin and vitamin injections, but the condition persisted. In November 1949 the patient was referred by his physician.

The 39 year old patient was not in acute pain. The right submaxillary region was swollen and tender to palpation. The swelling was about the size of a peach pit and not firmly attached. There was dysphagia and moderate limitation of the tongue movements. The mucous membrane of the floor of the mouth appeared to be normal, and the patient had received good dental care. Digital milking of the left submaxillary gland produced a normal secretion but none could be obtained from the right side. This procedure was painless on the left side but painful on the right.

A flexible, filiform whalebone bougie was passed through the orifice of the duct of the right submaxillary gland. After an insertion of about 3.5 cm. an obstruction was met, which on contact gave a grating sensation. A right lateral jaw roentgenogram left the impression of a mass within the body of the mandible rather than in the floor of the mouth. An occlusal roentgenogram proved the mass to be in the floor of the mouth, sustaining a diagnosis of sialolithiasis of the right submaxillary gland.

Under 1.5 per cent butethamine hydrochloride block anesthesia of the lingual nerve, a linear incision was begun in the floor of the mouth, about 1 cm. medial to the lower right second molar. It was carried anteriorly for about 2.5 cm., almost parallel to the lingual plate of the mandible. Blunt dissection was carried down to the duct. The duct wall was incised to reveal several concretions of large size and numerous others of small size. With extraoral digital pressure the floor was elevated in the submaxillary region, to expose the deeper structures. Fifty-seven stones were removed, using spoon-shaped curets. Three deep sutures were placed to coapt the deeper structures, and three sutures were placed to close the wound in the floor of the mouth. No. 000 black silk sutures were used. The patient was given 300,000 units of penicillin intramuscularly, as a preventive measure.

The patient was directed to use hot saline mouthwashes every hour for the balance of the day, and to apply a covered ice bag to the affected side of the face. An analgesic was prescribed.

When the sutures were removed five days later, the region had healed satisfactorily. The patient was seen 4 months and 12 months later for checkup. Roentgenograms were negative, and the patient was discharged as cured.

The flexible whalebone bougie as described by Bourgoyne is preferred to a Bowman's lacrimal duct probe because the latter annealed silver probe is much too rigid.

Sialolithiasis may occur at any age, but a predilection for persons in middle age is noted. About twice as many men as women are afflicted, and there have been more right-sided involvements reported than left-sided. The stones vary from yellowish to brown and are smooth or nodular, single or multiple.

Cheilotomy for pseudocheilia

S. Stephen Rafel. *Bul.Essex Co.D.Soc.* 23:7-8 Feb. 1956

The condition called "double lip," which appears as an extension of the inner aspect of the orbicularis oris muscle, has been reported by Thoma, by Ludwig and by Dingman and Billman. This condition, for which the term "pseudocheilia" is suggested, appears to be a congenital deformity but may be modified by trauma or a lip sucking habit.

A 32 year old white man complained that he "felt self-conscious" about the appearance of his lip. He could not recall that his lip ever was normal. He denied that he sucked his lip to excess or that he had ever suffered a severe blow to his lips.

The upper lip was overenlarged by a compressible, redundant mass of tissue covering the an-

terior teeth, and was delineated from the true lip by a distinct vermilion margin.

Under bilateral infraorbital block anesthesia with lidocaine hydrochloride, an incision was made along the entire length of the false lip at the line of demarcation. Hemostasis was effected by placing two cleft-lip clamps. Another incision was made on the inner aspect of the lip, and the false lip was excised with somewhat less tissue being removed at the midline. Irregular sections of the areolar tissue and labial glands were trimmed. The mucous membrane was undermined and sutured to the tissue of the lip with interrupted silk sutures. Postoperatively there was slight edema the first and second days. No pain or bleeding was encountered, and the sutures were removed on the fifth day. The pathologists reported stratified squamous mucosa, areolar connective tissue and numerous mucous glands.

The condition does not seem to involve directly the orbicularis oris muscle. It appears that the mucosa and submucosa on either side of the midline primarily are involved. Sagging at the midline is minimal because of the attachments of the incisivus labii superiorsis muscle and the nasolabialis muscle to bone. This accounts for the Cupid's-bow appearance of the lip.

Mechanical drainage of edemas

(Die mechanische Drainage des Ödems)

H. Schaeffer. *Deut.med.Wchnschr.* 80:1426-1429 Sept. 30, 1955

The reduction of edemas, especially angioneurotic edema or myxedema, by mechanical means has been and still is neglected in the customary therapy. The value of this technic, however, in aiding diffusion, and a consequent resorption of localized edemas, has been emphasized in several reports in medical and dental literature. The main objections to this method—the risk of infection or the trauma involved—have been overcome by the introduction of effective antibiotics.

In many instances a complete dehydration by mechanical drainage results in an improvement which may last for several years.

The method, therefore, should be used more frequently. With a new type of drain and additional implements, large quantities of fluid can be removed in a comparatively short time. Mechanical drainage also removes accumulations of clear yellow fluid from serous membranes which may be exudative. The condition may have resulted from inflammation or infection, or may be dropsical because of an obstruction of the venous return.

The electrolytes of the serum must be checked constantly during the mechanical drainage, and, whenever necessary, should be replenished to avoid excessive loss.

Mechanical drainage with a subsequent replacement of the lost electrolytes is the method of choice for treatment of a reduction of sodium in the blood serum resulting from the water retention and dilution of the blood.

Neither localized nor generalized collateral effects will develop when mechanical drainage of edemas occurring in the oral cavity is used.

Adamantinoma: a brief review of the condition with a description of a case

W. G. Holdsworth and N. L. Rowe. *Brit.J.Surg.* 38:255-260 Nov. 1955

Adamantinoma, also known as ameloblastoma, epithelial odontome and multilocular cyst, is a slowly growing, locally invasive neoplasm of epithelial origin which occurs principally in the jaws, and is most commonly situated in the third molar region of the mandible.

Although adamantinomas have a distinct and characteristic histologic pattern, there is a wide variation in their cellular structure. The reasons for this can be appreciated only if the development of a normal tooth is considered in some detail together with a comparison of the origin of a basal cell carcinoma with the rete mucosum.

Growth of the adamantinoma is painless, unless infection from the mouth, or more rarely the exterior, has supervened. There is a pronounced tendency toward recurrence after inadequate removal. Enlargement of the regional lymph nodes does not occur, and metastasis is rare. Radical resection of the affected region is the method of choice.

A 63 year old man was seen. Intraorally the edentulous mandible was obviously enlarged, from the region of the mental foramen to the retromolar fossa on the left side. Roentgenograms showed a multilocular radiolucent region of bone destruction at the left angle of the mandible, extending up the ramus towards the region of the sigmoid notch, but not involving the neck of the condyloid process.

Preoperatively, it was decided to insert (after resection of the affected portion of the mandible) a space retainer, constructed so as to restore the function and appearance of the mandible and to be left *in situ* indefinitely.

After careful clinical and roentgenographic measurements, a half-mandible of "girder-like" construction was made from sheet tantalum 2 mm. thick. The trough between the sides of the "girder" was filled with clear methyl methacrylate to avoid any dead space, but the acrylic resin was not extended beyond 2 cm. from either extremity to allow for the attachment of the prosthesis to the bone by tantalum wires passed through holes drilled in the ends of the bone.

A curved submandibular incision, placed within a natural skin crease, extended from a point 2 cm. below the lobe of the left ear forward to a point below the cuspid region on the same side. The platysma muscle and deep fascia were divided, and the periosteum and attached muscles were freed from the body and ramus. The neck of the condyloid process was drilled with a fissure bur attached to a dental handpiece, and tantalum wires were passed prior to division of the condyloid neck so as to assure adequate control of the bone. A similar procedure was carried out immediately anterior to the mental foramen, the intervening bone was resected in one piece and the prosthesis was securely wired in place. The wound was closed, using interrupted catgut sutures for the fascia and platysma muscle and black silk sutures to approximate the skin edges. Drainage was unnecessary.

No fixation of the jaws was attempted apart from firm bandaging. At no time was there any evidence of infection or of intolerance of the prosthesis by the tissues. The patient has been examined at intervals, clinically and roentgenographically, for two years. The appearance and restoration of contour are most satisfactory, and there is no evidence of tissue intolerance or bone resorption at the junction of the body of the mandible, neck of the condyloid process and the prosthesis.

▼

Roentgenology

Technic for enlargement of roentgenograms

(Técnica de ampliación radiográfica)

J. Rodrigo Rendón C. *Bol.Col.estomat. Guatemala* 4:26-36 July-Aug. 1955

The data supplied by dental roentgenograms of ordinary size are insufficient as a means for establishing a diagnosis or as a guide for operation. A technic for the enlargement of dental roentgenograms is presented. Conventionally, the original roentgenogram is called the "positive." A negative copy of the roentgenogram is called the "negative." Enlargement of the negative copy on a large x-ray film produces the enlarged roentgenogram. The image is exactly like the one in the original roentgenogram but it is more nearly perfect.

To obtain good enlarged roentgenograms an original roentgenogram of the highest quality should be used. There should be the least possible distortion, and the roentgenogram should have sufficient detail as well as the proper degree of contrast and density. The best negative to be used for enlargement is one in which density is neither pronounced nor light, one in which the clear zones show by proper translucence and the shadows by sufficient detail. Plus-XX, Super-XX, Ortho-X and Process films are used for the negative. All these films are extremely sensitive, and they result in negatives of good quality. The images do not change when the negative is enlarged several times its size. The negatives can be prepared in the printer or simply under a glass.

The negatives are prepared in the printer as follows:

1. The original roentgenogram is placed in the printer with its smooth, nonemulsionated surface over the glass of the printer and its emulsionated surface facing the cover of the printer.

2. The film which is to be used as the negative is placed in the printer with its emulsionated surface in direct contact with the emulsionated surface of the original roentgenogram. The time of exposure has been determined earlier by a test. Exposure is then made, and the negative is printed by the procedure of direct contact between the roentgenogram and the film. The negative is then developed with the developers which are given by the manufacturers of the films, that is, DK-50, DK-60-a, DK-72-E, and the Universal Developer MQ. The fixer F-7 is used.

The films should be handled as carefully as those of any other roentgenogram. They should be agitated during development to prevent imperfections in the form of the images, which may result from reactions of reduction of substances in the developer. After the negative has been developed and fixed by the usual procedures, it is used for the enlarged roentgenogram.

Before the negative is enlarged, a test for exposure time of the large x-ray film is made as follows:

1. Two thirds of a strip of film is covered with cardboard, and the remaining one third of the strip is exposed for two seconds.

2. The cardboard is moved to uncover an additional one third of the strip of film and another exposure of two seconds is made.

3. The cardboard is completely removed and the entire strip of film is exposed for two seconds.

At the end of the test, the first, second and third part of the strip of film will have been exposed for six, four, and two seconds, respectively. The test strip is then developed.

If the exposure was correct in any one of the three sections of the test strip, that exposure time should be used as the exposure time for the large x-ray film during enlargement. If all the three sections of the test strip were either overexposed or underexposed, the test should be repeated; when the correct time exposure has been found, it should be used for the enlargement of the film. Films 5 by 7 inches, 8 by 12 inches, or any other size may be used for enlargement. The films are developed in the usual way.

Enlarged dental roentgenograms are valuable for the diagnosis and interpretation of impacted teeth, fractures, roots displaced into a sinus, severe diseases of the maxillary bones, hypercementosis and other conditions. They are also of value as a guide for operations, for teaching in dental schools, for preparing collections of records of the most important pathologic conditions observed in patients who are cared for in dental clinics, and for the study of anatomy. When the enlarged roentgenograms are observed in a viewer, the details are much clearer in comparison with those observed in the original roentgenogram. Enlargements made on x-ray films enable surgeons to observe clearly the most minute details.

▼ Extractions

Present day state of the problem of dental extraction (Estado actual del problema de la avulsión dentaria)

J. González Methol. *Bol.odont., Bogota* 21:249-254 Nov.; 270-282 Dec. 1955

Dental extraction should be performed under the same conditions of asepsis, anesthesia and hemostasis which are common to all surgical interventions. Surgical asepsis and internal antisepsis include the sterilization of the instruments, preparation on the part of the surgeon, disinfection of the patient's mouth and of the extraoral operative field, and administration of chemical preparations and antibiotics before, during and after the extraction.

As a rule, local anesthesia is used in minor and major dental operations. Doses of 5 and 10 cc. of the anesthetic solution produce deep and sufficiently prolonged anesthesia without any danger to the patient regardless of the site of the operation. The various technics for inducing local anesthesia by blocking a nerve trunk or its branches have greatly improved in the last 30 years. They have been systematized as follows:

1. Infiltration anesthesia is used for the extraction of the upper teeth and for the removal of the six anterior lower teeth.

2. Anesthesia of the trunk of the maxillary nerve or its branches (regional blockage) is used for a multiple extraction of upper teeth. The in-

jection is made into the pterygoid fossa, and one injection alone produces deep and prolonged anesthesia of the entire half of the upper dental arch.

3. Anesthesia of the trunk of the mandibular nerve, with blockage of the mandibular, dental and lingual nerves, is used for the extraction of any of the lower teeth from the first bicuspid to the third molar.

Block anesthesia by the intraoral route is contraindicated in certain instances of infection. The extraoral route can be used successfully without any danger to the patient. Administration of sedatives prior to the induction of anesthesia is indicated for nervous patients and for patients with vagosympathetic disorders.

A better understanding of the phenomena that occur during the biologic restoration of the tissues after dental extraction has enabled dentists to solve many problems. Among them are the following: (1) the prevention of surgical hemorrhage by contraindicating dental extraction in patients with blood diathesis; (2) the control of surgical hemorrhage by the use of locally absorbable substances and other drugs, and (3) the reconstruction of the alveolar process. Fibrin foam, gelatin sponge and oxidized cellulose, alone or combined with the administration of thrombin or thromboplastin and antibiotics, control surgical hemorrhage and prevent the onset of infection. Gelatin sponge, introduced into the postoperative alveolar cavities, elicits formation of bone in the dead space with consequent reconstruction of the alveolar process. These results are of great significance in instances of multiple extraction on only one quadrant of the jaw.

Indications for extraction and the technics of the closed or the open method of extraction are based on the clinical and roentgenographic diagnosis of the type of dental disorder and on the anatomic relation of the involved structures to other structures in the vicinity. The closed method is indicated when it appears that the operation will be simple. The open technic is indicated when the results of clinical and roentgenographic examination indicate that difficulties may arise during the operation, that there may be surgical risks owing to teeth near the tooth or teeth that are to be extracted, or that there are pathologic conditions which cannot be eliminated through the alveolar route. The various technics of extraction that follow sectioning of the tooth can be used with either the open or the closed method. Odontosectioning is indicated for the extraction of impacted teeth. It is impossible to predict beforehand the course that the operation will take. Often it becomes necessary to abandon a simple technic and resort to a more complicated one. Therefore, anything that might be needed should this necessity arise during the course of the intervention should be on hand when the operation is begun.

Hospitalization for complete odontectomy

Charles H. Redish. *Indiana Univ.School Den. Alumni Bul.* p. 10-11 Jan. 1956

Although the number of patients requiring full mouth extraction of teeth has declined considerably in recent years, many patients still are seen whose teeth and supporting structures are beyond repair. When clinical and roentgenographic evidence has ruled out the possibility of retaining any of the remaining teeth, a method of treatment must be outlined. Two basic treatment plans are available. The first involves six to ten visits to the office for the removal of a small number of teeth each visit. The second involves hospitalization of the patient for the removal of all remaining teeth in one operation.

Indications for hospitalization include an apprehensive patient; a patient requiring radical alveolectomy after all the teeth have been removed; a patient with multiple regions of periapical pathologic conditions and a patient living alone.

The only contraindication for hospitalizing a patient for removal of all teeth is the presence of some systemic disease—such as blood dyscrasia, recent, pathologic cardiac or respiratory condition or severe hypertension—that would make the anesthetic and surgical procedures risky.

Numerous advantages accrue to the patient through hospitalization. Only one trip must be made, eliminating six or more trips to the dental office. The alveolar process can be trimmed more efficiently and smoothly when the entire arch is done at one time. Trained hospital personnel are available for any postoperative care required. Ap-

prehensive patients are medicated the night before the surgical procedure and premedicated before the procedure. The general anesthetic is administered through an endotracheal tube by an anesthesiologist trained to handle any emergency. The patient usually is hospitalized only 48 hours. The time lapse from the first extraction to delivery of the dentures is reduced appreciably.

The only apparent disadvantage is the additional expense of hospitalization, and the amount of time saved with this procedure more than compensates for the extra cost.

▼ Anesthesia and analgesia

The technic of administration of a local anesthetic for repair of cleft lip in infants

W. H. Steffensen. *J.Internat.Col.Surgeons* 24:481-482 Oct. 1955

A simple, safe anesthetic technic applicable to infants up to two months of age has been used in 265 cases, with no fatalities and only one instance suggesting sensitivity to the drugs. The schedule of dosage, based on the assumption that the infant will be operated on at 8:00 A.M., is as follows:

Last feeding at 6:00 A.M.

Elixir of phenobarbital, 4 cc. at 6:00 A.M.

Elixir of phenobarbital, 4 cc. at 6:30 A.M.

A mixture of paregoric, 4 cc.; whiskey, 8 cc., and sweetened water in a quantity sufficient to make up 60 cc. Half of this mixture is fed the infant by *gavage* at 7 A.M. The *gavage* tube is left in place, and the remaining 30 cc. of the solution is sent to the operating room with the patient. Should the baby appear unduly responsive to his environment, an additional quarter of the solution should be given prior to removal of the *gavage* tube.

The baby is prepared for surgery. The operative area is outlined prior to infiltration of the local anesthetic solution, 1 per cent procaine hydrochloride and epinephrine. A few minutes is allowed for the local anesthetic to take effect, and the operation is begun. In most instances the operation can be done without vocal protest or any movement of the child's head. When the operation has been completed, the *gavage* tube is reinserted into the stomach, and any remaining drug is removed by washing; 90 cc. of water is instilled as a fluid substitute for the feeding the infant will miss because of drowsiness. The child will be awake sufficiently to take a portion of his 2 P.M. feeding, and is completely alert for the next feeding.

The distortion of the lip produced by infiltration of the local anesthetic does not alter the result if the markings have been made prior to infiltration and if the amount of infiltrate is distributed equally on both sides of the cleft. Bleeding is minimized by the epinephrine. The major lip vessels need be clamped for only a few moments, and rarely need to be tied.

An additional advantage of the technic is the absence of the appliances used for general anesthesia, such as tubes and catheters. In infants older than two months, a basal dosage of tribromoethanol solution (Avertin) or rectal thiopental is used in conjunction with the local infiltration.

Psychological factors in anesthesia

E. E. Hamilton and Virginia Hamilton Trexler. *Internat.J.Anesth.* 3:13-15 Jan. 1956

Arthur E. Hertzler once stated: "Fear is too little regarded as an adverse influence in the outcome of an operation. . . . I refuse to operate on a frightened patient. I have seen too often patients who stated they would not recover, who proceeded to make good their prediction. Some of these cases did not show the cause of death, even in autopsy. I believe they are actually and literally scared to death."

Fear on the part of the patient is one of the most important obstacles to be overcome if successful, fast and uneventful anesthesia is to be obtained. To dissipate anxiety, the operator must inspire the patient's confidence. To achieve this, the operator must have confidence in himself. His confidence is directly proportional to his ability to perform the operation successfully.

A wise choice of anesthesia should be made, with the patient's preference playing a part in the decision. When general anesthesia is the choice, a cautious and gentle induction technic must be used. The patient who can be carried pleasantly into the first stage of anesthesia will probably be a good patient, a quiet patient in the surgical stage, and will probably have a pleasant recovery.

Parents, friends or relatives should not be permitted to watch and mentally criticize an operation of which they know nothing. The child who asks that mother "stay in" only wants her there to listen to his cries and to sympathize. If the child will agree to refrain from crying and will cooperate, the mother may be permitted to remain until the child is asleep or until he ceases to cooperate.

Sometimes it is difficult to convince the patient that anesthesia is present. The patient who confuses pressure with pain may be convinced that anesthesia is present if a blunt instrument (burnisher) is pressed on the gingiva on the side where anesthesia is present and then pressed on the gingiva at the other side of the mouth where there is no anesthesia.

Anesthesia in the dental office: A review of 15,000 cases

John C. Austin. *North-West Den.* 34:327-330 Nov. 1955

A random sampling technic was used to analyze 15,000 cases. Five hundred consecutive patients, no. 9,919 to 10,419, were studied. There were 210 men and 290 women patients. The greatest tooth loss occurred in the 20 to 24 year age group. After the age of 49 the number of patients who came for dental extractions diminished rapidly. In 92 per cent of the patients, five teeth or less were extracted. The greatest number of extractions under one anesthesia was 13. Slightly more than 11 per cent of the anesthetics were given for the removal of impacted teeth. Alveolectomies were performed in 236 patients. Eighty-seven per cent of the operations were six minutes or shorter in length and the longest was 25 minutes.

Thiopental sodium was used in approximately 82 per cent of the anesthesias, either alone or in combination with other agents. Nitrous oxide, as a total anesthetic agent, was used for children when the procedure was very short. The incidence of nausea was approximately 10 per cent for those taking nitrous oxide, and 4 per cent for those taking thiopental sodium. There were no instances of total laryngospasm. There were no deaths or serious complications when thiopental sodium was the principal anesthetic agent.

Thiopental sodium most nearly meets the requirements of an ideal anesthetic agent for use in the dental office. The awakening period is longer than that which would be considered ideal; adequate recovery space must be provided.

▼ Surgical pathology

Chondrosarcoma of the maxilla

W. Paterson. *J. Laryng.&Otol.* 69:132-139 Feb. 1955

Chondrosarcoma occurring in the maxilla is a rare tumor. The first reported instance of chondrosarcoma of the maxilla is ascribed to Mollison in 1916. Since then, Miles has collected six cases from the literature and added two of his own, and a further case has been reported by Link. The case here reported appears to be the tenth reported case.

These tumors have been recorded at ages varying between 19 and 56, with a mean average of 40.5 years. The patient in the case to be reported was 42 years old. Willis, as well as others, has stated that the majority of instances of chondrosarcoma occur between the ages of 30 and 50 years. The tumor has been recorded in both sexes, occurring in six women and four men. The tumor appears to be locally invasive and may remain localized in the maxilla for some time, although invading the antrum, orbit, nose and mouth. There is evidence that the tumor may invade veins and metastasize to the lung, although in the lung it often has no resemblance to the parent tissue and probably does not show any cartilage cells. Chondrosarcoma is less malignant than

other types of bone sarcoma. Cartilaginous tumors are difficult to separate into benign and malignant types. Most authorities agree that attention should be focused on the cells themselves and not on the matrix. Points that would rule against a tumor being benign are as follows: (1) increased cellularity; (2) nuclear pleomorphism, and (3) giant cells with large single or multiple nuclei.

A dwarfed colored woman, aged 42 years, was first seen in the ear, nose and throat department on June 19, 1954. She had been referred by the dental hospital and complained of facial pain on the right side and swelling with nasal catarrh of five weeks' duration. In June 1953 an unerupted cuspid tooth, together with a small tumor, had been removed from the right alveolar margin; the tumor, on examination, had been reported as a chondroma.

Examination revealed a swelling of the right maxilla with obliteration of the nasolabial groove and widening of the nostril; a small polyp in the right middle meatus; a hard, lobulated swelling of the right maxilla extending from the alveolus up to and through the orbital margin, and from the pyriform opening medially to the malar bone laterally. The soft tissues of the cheek could be moved freely over the swelling. Roentgenograms showed that a mass filled the right maxillary antrum, and the lower margin of the orbit, especially in its medial portion, had been destroyed. The medial and anterior walls of the maxillary antrum also appeared to have been destroyed. Injection of a contrast medium into the inner surgical space or muscle cone demonstrated an upward displacement of the orbital contents, showing the extent of the space-filling lesion into the orbit. No metastasis was noted in roentgenograms of the chest and skull.

Under general anesthesia the tumor was approached by fenestration of the right side of the hard palate. The palate was removed and the tumor was found to occupy the whole of the maxillary antrum and to replace the anterior wall. The lateral wall of the nose was displaced to the midline, but there was a clear plane of separation between it and the tumor. It became obvious at this stage that it was not going to be possible to deliver the tumor by this access. The classical Ferguson approach to the upper jaw was then performed, but the lateral extension of the incision through the eyelid was omitted. The soft tissues of the face and eyelid were elevated from the anterior surface of the tumor and the lateral and superior limits were defined. There seemed to be a clear line of cleavage around the tumor and at no point did it seem invasive. The frontal process of the maxilla was divided from the pyriform opening into the orbit and the malar bone was divided through into what remained of the interior orbital fissure. The tumor was then grasped with bone forceps and rocked out of its bed. There had been no gross blood loss, and replacement was limited to one pint. The postoperative progress was satisfactory.

Pathological examination revealed a firm, roughly spherical tumor about 6 cm. in diameter, partly calcified, partly fibrous or cartilaginous, one surface attached to muscle, also an outlying nodule about 1.5 cm. across.

In view of the highly cellular marginal parts of this tumor, the presence of nuclear pleomorphism, giant cells and occasional mitosis, and the absence of encapsulation, it must be regarded as chondrosarcoma, though probably of relative low-grade malignancy, and apt to recur, rather than to metastasize.

Congenital epulis (granular-cell myoblastoma or fibroblastoma) in a ten-weeks-premature infant

George T. Hankey. *Proc. Roy.Soc.Med.* 48:1015-1017 Dec. 1955

The patient, an infant girl, weighed 3 pounds 12 ounces at birth. The only abnormality was a pedunculated tumor growing from the gingiva of the right lower molar region, making closure of the mouth difficult and suckling almost impossible. The tumor was removed under lidocaine hydrochloride local anesthesia. When examined a year later the healthy baby weighed 16 pounds 7 ounces. There was no sign of the tumor and the teeth and mandible had developed normally.

The tumor was ovoid, smooth, firm and covered with normal pink mucosa. Its base, where attached to the gingiva, was 0.7 cm. in diameter, and its long diameter which projected into the mouth was 1.2 cm. The cut surface showed a

homogeneous grayish appearance. A section showed an outer layer of keratinized squamous epithelium enclosing vascular and cellular connective tissue in which were small numbers of inflammatory cells. The blood vessels were of the capillary type. Around them, in the superficial dermis, were numerous spindle-shaped cells with large nuclei and larger rounded cells with abundant granular cytoplasm which did not stain with scharlach R.

This tumor was not the traditional "epulis," fibrous or peripheral giant cell, as described by Thoma (1954), but was a tumor deriving from embryonic cells.

Cancer of the floor of the mouth

Alberto Rahausen and Carlos Sayago, Santiago, Chile. *Am.J.Roentg.* 75:515-518 March 1956

Forty patients with malignant tumors of the floor of the mouth were treated at the Radium Institute of Santiago, Chile, between May 1930 and May 1949. In the same 19 year period, 13,300 patients with cancer were seen, of whom 518 had cancer of the mouth. Patients with cancer of the mouth thus constituted 3.89 per cent of all cancer patients, and cancer of the floor of the mouth comprised about 7.7 per cent of all malignant tumors inside the mouth.

Of the 40 patients, the youngest was 27 years old and the oldest, 82. The largest group of patients was found between the ages of 51 and 60. Thirty-eight patients, or 95 per cent, were men. Why cancer of the floor of the mouth occurs more often in men than in women is unknown.

Cancer of the floor of the mouth has no particular symptomatology. Any ulcerated lesion which does not heal in two to three weeks should be submitted for biopsy and histopathologic examination. In some patients, pain related to the tongue and transmitted to the ear was the initial symptom. In a few instances the first sign observed was an indurated mass in the submaxillary region with the typical features of a lymph node metastasis.

A clinical diagnosis of lymph node metastasis was made in 18 of the 40 patients on admission; of these, 13 were operated on and only five showed metastasis. Epidermoid carcinoma grade 1 was present in 35 of the 40 patients.

Treatment requires collaboration between the surgeon, dentist and roentgenotherapist. General hygienic measures should always be applied first. These include a careful examination by the dentist, extraction of all carious teeth and removal of the metallic prostheses in the lower jaw close to the floor of the mouth. Radiation treatment after extraction should not start until the tooth socket is healed, in order to prevent future radionecrosis of the mandible.

The best results were obtained by volume implantation of radium needles followed by the external application of radium. If there is invasion of the gum or evidence of lymph node metastases, surgery, that is, resection of the floor of the mouth plus hemimandibulectomy and a radical neck dissection, is advised. If lymph node metastasis is not present on admission, the primary lesion is treated with a radium implant, followed by a prophylactic submaxillary and submental dissection.

The condition in two of the 40 patients was too far advanced for any treatment. Among the remaining 38 patients, six (15.7 per cent) survived five years. Of the six, none had lymph node metastasis or invasion of the gingiva; four had limited invasion of the adjacent tongue. The average time of evolution before treatment was ten months in the successfully treated patients as against 5.4 months for the failures.

Development of a large cyst in the upper jaw caused by gypsum particles left in an extraction wound (Entstehung einer Zyste im Oberkiefer durch Belassung von Gipsresten in einer Extraktionswunde)

F. Krebs. *Deut.zahnärztl.Zschr.* 10:1867-1868 Dec. 15, 1955

The patient, a 19 year old girl, came for periodic examination, at which time a parulis on the left side of the upper jaw was discovered. The patient's teeth seemed to be in an excellent condition. The cuspid and the second molar on the left side of the upper jaw had artificial crowns, and a

missing lateral incisor had been replaced by a partial prosthesis anchored to the left cuspid.

Full mouth roentgenograms revealed the presence of a large cyst reaching from the first incisor to the left cuspid, and an edema in the labial tissue.

A broad incision was made, and the wound was temporarily tamponed. On the second day, the central incisor and the left cuspid were extracted under local anesthesia. The cyst, however, was left open.

After elimination of the artificial crowns and the partial denture, a conglomerate of friable material was found in the alveolus of the lateral incisor. A few days later, gypsum particles were excreted from the wound. A chemical examination revealed that the whole friable material consisted of accumulated gypsum particles.

The patient disclosed that the lateral incisor had been extracted for purely esthetic reasons (because of a slightly crooked position) by a "wandering dentist." This unlicensed practitioner also had taken a plaster cast to construct the partial denture.

The cyst at the time of the surgical intervention was 4.8 cm. deep and almost 5 cm. wide; after five months, the wound still was 2 cm. deep and wide.

Unquestionably, the development of such a large cyst could only be caused by the gypsum particles which remained in the extraction wound and irritated all the neighboring tissues.

Present status of knowledge concerning the cleft palate child

Robert M. Ricketts. *Angle Orthodont.* 26:10-21 Jan. 1956

In the United States cleft deformity affects approximately one of every 800 newborn children. Based on the current birth rate, 6,000 patients with cleft palates will be born each year. More than 100,000 children with cleft palates today need or receive care.

Several etiologic factors have been suggested. Temporary anoxemia, malnutrition and excessive cortisone all have produced cleft conditions in experimental animals. Mechanical defects, such as failure of retraction of the tongue, hydrocephalus and vascular failure have been presented as etiologic factors. The presence of other malformations in a large percentage of instances of cleft palate suggests that an intra-uterine disturbance may arrest the development of all differentiating organs at a particular time. Inheritance is thought to be a predominating factor, especially in the complete cleft lip and palate, which is found twice as frequently in males, although it is thought to be a recessive trait.

Some investigators report that cleft lip and cleft palate are separate malformations, the lip forming some time between the fourth and sixth weeks of pregnancy, the palate forming between the eighth and tenth weeks.

Cephalometric roentgenography has contributed to the knowledge of growth and development of the skull. Cross sectional studies have strongly suggested that past surgical measures resulted in lack of growth of the upper jaw. Knowledge of the physiology of the lips, velum, tongue, mandible and pharynx is essential.

The current trend in care for the child with cleft palate is to the team approach. The specialties represented on the team fall into three main groups—medical, dental and speech-psychosocial. The pediatrician is perhaps the ideal person to direct a cleft palate team. He can best integrate the total services because "the whole child" is his goal.

The majority of growth findings have been made by the orthodontist, simply because roentgenograms of the head have provided the information and cephalometrics has been largely the tool of the orthodontist.

Changes in the timing of surgery have made it necessary for speech aids to be employed at an early age. Since appliances are needed yearly until growth has been completed, the prosthodontist also must be familiar with normal growth tendencies. The prosthodontist is also called on as a last resort to construct speech appliances in older children or adults.

Recent methods have brought the skeletal framework of the nasopharynx into focus as being important to the diagnosis of certain conditions of speech and breathing. Preservation of the adenoids is in the best interest of the cleft palate patients.

Periodontics and endodontics

▼

Periodontics

Local treatment of periodontal diseases

(Gedanken zur Lokalbehandlung der Parodontopathien)

Josef Kluczka. *Zahnärztl.Welt* 10:511-518
Oct. 25, 1955

The correct differentiation between inflammatory, dystrophic and neoplastic types of periodontal disease, and the utilization of the nomenclature of the A.R.P.A. Internationale, are essential when reporting on such diseases.

A clear distinction should be made between the preliminary treatment, the actual therapy of the gingival pockets, and the subsequent treatment, especially in instances of chronic progressive marginal periodontitis.

Preliminary treatment consists mainly in the elimination of external irritation. Overexertion of individual teeth or of tooth groups must be avoided. Factors leading to tooth mobility which may cause traumatic inflammation must be corrected. Recently developed methods such as enzyme therapy and the therapeutic application of penicillin, antibiotics or anti-infectives must be considered.

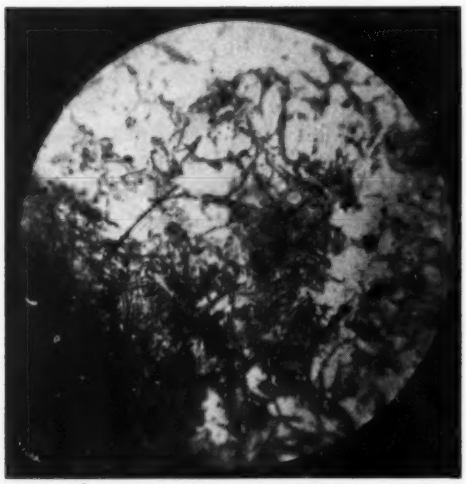

Figure 1 Organic calculus accumulation

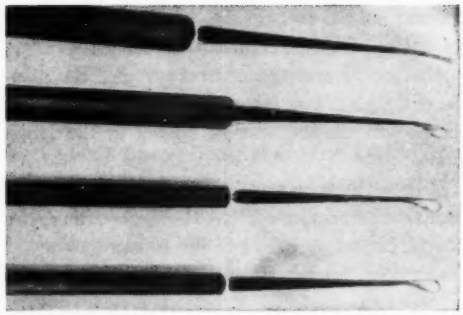

Figure 2 Instruments used in curettage

During actual treatment, immediate removal of calculus and of subgingival concrement is important. The film on the teeth, as a preliminary phase of calculus formation, also must be removed. Systematization of the actual therapy, taking into consideration the biologic aspects, is essential.

Normalization of the disturbed metabolism of the periodontal tissue can be obtained best with oxygen therapy.

Removal of necrotic material from periodontal pockets usually will be necessary. In theory, a reattachment of tissues is possible; in practice, however, it is far better not to rely on such a possibility. Indications or contraindications for curettage often force the periodontist to consider additional treatment methods for actual or for subsequent therapy. Cauterization, however, is objectionable for biologic reasons. In some instances, therapeutic puncture with hot needles (ignipuncture) can be used, especially when a contraction of cicatricial tissue is desirable or when recurrence of inflammation is feared. Ignipuncture can be effective in the treatment of shallow gingival pockets (up to 4 mm. deep) to check their increase in depth.

When there is deep pocket formation, hyperplastic gingiva, spongy alteration of the mucosa,

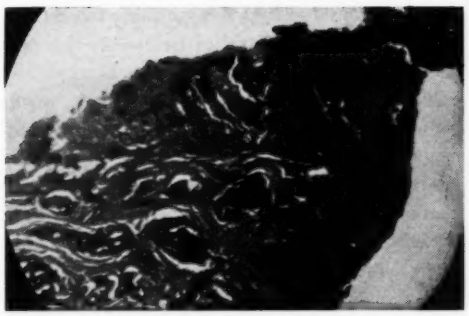

Figure 3 Gingiva of a dog after cauterization; necrosis of the epithelial layers

Figure 4 Ignipuncture of the gingiva

and unfavorable condition of teeth and jaws, gingivectomy is the best treatment.

If unfavorable conditions of the oral epithelium exist at the bottom of the pockets, vertical decomposition, bacterial accumulation, severe inflammation, suppuration and necrosis, Neumann-Widmann's aperture method or Hylin-Müller's alveolar plastic technic is recommended. Both technics, however, should be used only in the instances described.

Gingival dressings containing disinfectants, chemotherapeutics, spasmolytics or mild cauterants should be used in nearly all instances of periodontal disease. When diathermy puncture is applied, no dressing will be necessary because the insignificant needle wounds heal without protective covering.

Periodontal diseases occur frequently in poorly nourished persons as a result of direct trauma or from an undeterminable cause. Before treatment, the patient's general health and the pathologic oral condition should be thoroughly examined.

Histopathology of the pulp in instances of periodontal disease

(Die Histopathologie
der Zahnpulpa bei Paradentopathien)

Ernst Sauerwein. *Deut.Zahn Mund Kieferhk.* 22:289-300 Aug. 1955

According to many authors, dystrophic alteration of the pulp, appearing in instances of periodontal disease (periodontosis) is accompanied by similar changes in the tooth medulla. It has been assumed that both symptoms were caused by neurocirculatory disturbances.

Examinations, made recently at the Dental Institute of the University of Bonn, Germany, do not verify this assumption. Of 154 pulps of teeth, extracted from patients with dystrophic periodontosis, 23 pulps (15 per cent) showed neither regressive alteration nor reticular degeneration. In other specimens, slight changes were established, but these were no different from alterations occasionally appearing in a healthy and normal dentition.

The netlike degeneration of the pulp is not necessarily a consequence of periodontal dystrophy. Other possible causative factors are (1) obstruction of the canaliculi by denticles or adventitious cysts, and (2) external factors, such as thermal irritations of the unprotected neck of the tooth, or toxin resorption from gingival pockets or from interdental regions.

Vitamin deficiency and metabolic diseases may cause a regressive degeneration of the periodontium. This symptom can be observed frequently in children afflicted with periodontosis. In elderly patients, however, a severe rarefaction of the alveolar process often can be observed simultaneously with a healthy condition of the pulp.

Recession of the gingiva, exposing the neck of the tooth root but without pocket formation, may result from local irritation.

Frequently in periodontal disease, a fusion occurs between cells and neighboring (surrounding) fibers. Fine and long chords are formed. The term "ultracapillaries," given to these trabeculae by some authors, is misleading because the supply to the pulp is affected not by these trabeculae but by diffusion and osmosis.

▼ Endodontics

Present status of bacteriologic control in endodontics (Estado actual del control microbiologico en endodoncia)

Oscar A. Maisto. *Gac.odont.* 2:83-96 Aug.-Sept. 1955

The action of antiseptics and antibiotics on the microorganism responsible for pulpal and periapical lesions has been intensively studied in recent years, but the value of bacteriologic control in endodontics is still a subject of controversy.

Of the two methods that have been developed for establishing the sterility of root canals before they are filled—smears and cultures—the second is the more logical, because smears merely show whether bacteria are present in the material collected. Specimens for culture should be taken from the canal walls and the periapical exudate when the operator thinks the canal is ready to be filled. If the results are negative after two or three days of incubation, some authorities advise immediate filling of the canal, whereas others advocate a second culture and a few even leave a sterile wick in the canal for a few days before filling it.

If the many difficulties of technic and interpretation associated with bacteriological study were compensated for by appreciable advantages in the conduct or control of treatment, this procedure would be justified; in fact, however, its value is uncertain. Whenever, for example, roentgenographic examination shows a periapical pathologic process of pulpal origin, a therapeutic intervention is required, even though previous bacteriologic tests may have been negative. On the other hand, when roentgenograms taken after root treatment show that granulation tissue has been replaced by calcified tissue, usually osteocementum that may even occlude the periapical foramen, only the absence of infection and a state of biological stability have made this repair possible.

Changes in the periapical bone have been shown to occur whether or not the canal is infected. Consequently, roentgenography, when correctly performed and well interpreted, is apparently a more reliable guide to diagnosis than bacteriologic investigation, especially when taken in conjunction with clinical observations. Bacteriological control, therefore, has no place as a routine procedure in everyday practice, although it may be useful in exceptional cases.

The present tendency in endodontics is to eliminate the cause of the periapical lesion by combating the infection in the canal with all the means now available; by filling the canal to prevent bacteria from passing to the periapical region if the first objective has not been perfectly attained; and by carefully avoiding chemical or surgical trauma to the periapical tissues responsible for repair. Ideally, the treatment should be carried out in a single session; in practice, however, a larger number may be required. In any case, a correct clinical and roentgenographic diagnosis, isolation of the operative field by a rubber dam, sterilization of instruments, asepsis during the treatment, correct preparation, and disinfection and filling of the canal with substances that will not injure the periapical region, are essential to the success of the treatment.

Figure 1 The sequence of events in dental disease. There is a gradual transition of activity from the child to the adult

Preventive and public health dentistry

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Caries etiology and control

An outline of dental caries

Geoffrey L. Slack. *Med.Illust.* 10:175-182 March 1956

Dental caries is a disease characterized by the formation of open lesions in the enamel, dentin and cementum of the tooth. If allowed to progress unchecked, these lesions set in motion a cycle of events that leads to the loss of function and ultimately complete disintegration of the dentition. The effect of dental caries in the young is far-reaching, and predisposes to dental disease of the supporting tissues in later life.

Ignorance of its cause has allowed dental caries to become the most prevalent of all chronic diseases. Less than 3 per cent of civilized people are caries-free. The prevalence of dental caries is increasing.

In isolated primitive communities still out of contact with civilization dental caries is almost nonexistent. Dental caries in modern civilized communities is widespread. It is primarily a disease of infancy and childhood, but so much damage has occurred by the time manhood is reached that few susceptible tooth surfaces are left unattacked.

A wide variation of susceptibility exists among individual teeth in both the deciduous and permanent dentition, and among surfaces of the teeth. The surfaces, in order of susceptibility, rank as follows: (1) molars and bicuspids and lingually on upper incisors—pits, fissures and grooves; (2) proximal surfaces of all teeth; (3) buccal surfaces of all teeth near the gingival margin, and (4) lingual surfaces of all teeth (but more commonly in the molars) near the gingival margin. The degree of susceptibility is largely determined by the length of time that food debris can lodge undisturbed. The buccal and lingual surfaces are usually kept clean by the movements of the cheeks and tongue, and for this reason caries rarely occurs on the smooth surfaces of normal teeth.

The development of the carious lesion and the mechanism of dental caries are discussed.

A factor established beyond doubt is that carious lesions result from the activity of bacteria growing in a suitable medium on the tooth surface.

The only satisfactory treatment of a carious lesion is the "excision" of the affected tooth structure and the restoration of the teeth to normal contour and function.

Figure 2 A model of the upper jaw showing (by black markings) the areas most susceptible to caries. Three teeth have been removed to show the areas just below the contact points

The British Dental Association, in a memorandum entitled "Dental Health of Children" (1954), recommended the following measures to prevent caries: (1) the restriction of fermentable carbohydrate intake in solid or liquid food or confections between meals, and the substitution if necessary of raw fibrous fruits; (2) the planning of meals so that sweets are eaten at the table and fibrous foods such as apples are eaten last; (3) the invariable use of the "bubble and swallow" habit with plain water after eating or drinking; (4) toothbrushing whenever possible but always the last thing at night, and (5) the regular dental care of all children from two years of age on.

Prevention of dental caries: its possibilities at present and in the future (Aspects présents et futurs de la prophylaxie de la carie dentaire)

Ch. Leimgruber. *Rev.mens.suisse odont.* 65:1187-1221 Dec. 1955

The development of a carious cavity begins on the tooth surface; the process of destruction and degeneration advances in a centripetal direction. The caries-promoting agents (acids, bacteria and enzymes) invade enamel and dentin, and complete the deterioration. Classical theories on caries try to explain how carious cavities occur but do not demonstrate why a tooth becomes carious.

The tooth is either healthy and intact or it is carious. The deciding factor lies in a variable agent present in each tooth. This agent influences the permeability of hard tissues, and this activity controls whether the caries-promoting elements can enter the tooth structures.

The hard tissue consists of an organic and a mineral component and also contains fluids. The fluid content depends on the protein content. The tooth protein is a hydrophil colloid, and its chemicophysical characteristics are determined by the degree of hydration. The penetrability and the impenetrability of the hard tissues are in a fixed proportion to the fluid content of the tooth protein. The hydrated tooth protein acts as a protecting colloid for the mineral crystallites.

The oncotic pressure exerted on the protein induces the organic components to absorb water, thereby producing swellings. When the water absorption is moderate, the protein is in a "gel" condition. When the oncotic force is unchecked, the protein absorbs large quantities of water, and the protein comes into a "sol" condition.

In the gel condition, the tooth is resistant to caries. In the sol condition, however, the tooth becomes permeable to acids, bacteria and enzymes. These caries-promoting agents invade the hard substances and cause carious destruction. The striving for water is a normal function of protein. When the oncotic pressure cannot be checked, the tooth automatically becomes caries susceptible.

Caries prevention can only succeed if it checks the oncotic pressure or counteracts it. The gel condition must be regained and maintained.

If the saliva permits an unchecked expansion of the oncotic pressure, the tooth is caries susceptible. The saliva, therefore, must contain components which counteract the oncotic pressure by producing desiccation of the protein.

The human saliva contains ions which, according to Hofmeister's lyotropic series, can be classified as (1) cariogenic ions which do not counteract the oncotic pressure, and (2) antagonistic ions which check the oncotic force and keep the protein in the desired gel condition.

The ionic synthesis of the saliva, therefore, determines the fate of the tooth. When cariogenic ions predominate, the teeth are caries susceptible; when antagonistic ions predominate, the teeth are caries resistant.

Three possibilities exist to counteract the deleterious influence of the cariogenic ions: (1) the combination of cariogenic ions and primary amine in the form of amino acid; (2) the combination of fluorine and cariogenic magnesium, and (3) an addition to the ionic composition of the saliva in the form of salts (antagonistic anions and cations). The third possibility has the greatest chance of success. It should be applied in instances in which the saliva does not possess enough natural antagonistic ions, as during the period of body and tooth development or during pregnancy.

Several tests prove that caries is caused (or promoted) by pathologic swellings of protein. Problems such as the relative prophylactic effect of fluorine, the increase of DMF frequency dur-

ing the developmental stage, the decrease of DMF frequency when the diet has been changed from soft to hard (as usually caused by war or famine), and the increase of caries frequency when a diet rich in carbohydrates is consumed, seems to be solved.

Now it is possible to form the basis for a natural and effective caries prophylaxis.

Investigations of fluoridated milk as a caries prophylaxis (Untersuchungen über die Fluorierung der Milch zur Kariesprophylaxe)

Eugen Ziegler. *Mitt.Naturwissenschaftl.Ges., Winterthur, Switzerland* 28:3-63, 1956

Caries is a disease of civilization. During the last decades, the increase in caries frequency has been alarming. Caries now has become the most widely spread disease.

The etiology of caries still is unknown. Carbohydrates such as starches, sugars, celluloses, and gums, especially chocolate, pastries, wheat flour, bread and rice, promote carious lesions.

Research on caries revealed the prophylactic effects of fluorine. When the intake of fluorine is not greater than from 1.0 to 1.5 ppm, no disadvantageous secondary effects (mottled enamel) occur. Researchers, such as the Italian Morichini, the American Dean and the Russian Minkh, have obtained almost identical results in their studies on the effects of fluorine.

The Swiss school and health authorities and the dental organizations expect that Switzerland soon will introduce fluoridation of the drinking water. Even if a law providing for general fluoridation is passed, many parts of Switzerland cannot participate because in those regions no central water system exists. As possible substitutes, fluoridated salt, tablets or tooth paste have been recommended. All those substitutes, however, have some disadvantages. Infants, preschool children and pregnant women consume no or insufficient salt. In such substitutes, the proper intake of fluorine cannot be supervised or controlled.

Such disadvantages do not exist when fluorides are added to fresh milk as a caries prophylaxis. The supervision and control is even easier than it is in water fluoridation, because each bottle sold is labeled either "no fluorine" or it will show the exact fluorine content.

In fluoridation, a waste of fluorine occurs, because only 25 per cent of the water used is consumed for drinking purposes. Another advantage of fluoridated milk is that all dairies will add fluorides to milk uniformly in accord with a formula supplied by the Swiss health authorities.

Fluoridated tablets cost from 0.5 to 1.00 Swiss francs per child per annum. Fluoridated milk would cost only 0.15 Swiss francs per person per annum.

Climatic differences play hardly any part in milk consumption. McKee in Pasadena, Calif., and H. Herz in Sweden already have reported successful experiments with fluorides added to milk. In Switzerland, similar experiments were carried out at the Evangelic Institute in Sonnenbühl and at the Municipal Orphanage in Winterthur. The results were almost identical with those reported on the drinking water fluoridation in Grand Rapids, Mich.

Previously performed animal tests (with rabbits, rats and sheep) revealed that fluorides added to milk functioned as a caries preventive and showed that they had no injurious effects or after effects.

In the spring of 1955, the school authorities of Winterthur decided to introduce fluoridation of pasteurized milk on a trial basis. Druggists, dairies and parents were informed about the procedure and the formula to be used. A solution of 2.2 per cent sodium fluoride was made available in Pyrex bottles (50 cc.). The contents of each bottle served for the fluoridation of 500 liters of pasteurized milk. After mixing, each liter of milk contained 1.00 mg. of fluoride.

To avoid mistakes, only 12 bottles of the solution (for the 12 day trial) were given to each dairy, and for control purposes all empty bottles were collected by the health authorities. Because the addition of fluorides to pasteurized milk is not expensive, the dairies undertook this trial service without charge.

In May 1955, Winterthur's 2,163 school children received fluoridated (pasteurized) milk. No disturbances caused by the added fluorides have been reported. The results of this comparatively large scale experiment will be reported at a later date.

In Zurich, fluoridated salt is administered, but the authorities of Winterthur will proceed with milk fluoridation. To avoid a double intake of fluorides, neither fluoridated salt nor fluoridated tablets are obtainable in Winterthur.

With the start of fluoridation of pasteurized milk, the first step in caries prophylaxis is made, now reaching regions where the lack of centralized water systems makes the fluoridation of drinking water difficult or even impossible.

After a few years of observation by the health authorities, the dental profession and the research institutes, final conclusions as to whether fluorides added to pasteurized milk can serve as an effective caries prophylaxis will be established.

Teeth and politics

Editorial. *Commonweal* 63:322 Dec. 30, 1955

For some reason the leaders of the fight against fluoridation have, by and large, been identified with right wing political views. The chances are about nine out of ten that the opponent of fluoridating drinking water is also opposed to the United Nations in general and to UNESCO in particular, to liberal Republicans and Democrats, to "creeping" socialism and in some instances to the income tax.

It is not known why opposition to fluoridation should so often be one item in a complex of right wing political dogmas.

If the foes of fluoridation really feel as strongly as they seem to, perhaps in years to come one will be able to tell much about a parent's politics by an examination of his children's teeth.

Dental caries in children one to six years of age as related to socioeconomic level, food habits and toothbrushing

Bhim Sen Savara and Theodore Suher. *J.D.Res.* 34:870-875 Dec. 1955

The association of the incidence of dental caries with the socioeconomic status of parents was investigated in 279 children living in Portland, Ore. The mother of the child was interviewed at home by trained interviewers to determine the socioeconomic status and to obtain information on the food and oral hygiene habits of the children. The results are presented tabularly.

No association was found between dental caries (def teeth) and (1) desserts consumed at lunch or at dinner, (2) number of times per week cake, pie, ice cream, gelatin, cookies or candy were consumed, (3) number of times per week fresh fruit was consumed, (4) frequency of food consumed between meals, (5) economic level of the parents as estimated by the interviewer, (6) type of father's employment, (7) income of parents and (8) number of times per day the child brushed his teeth.

Whereas the cultural level of the parents was found to be unrelated to dental caries, the number of years of education received by the father was rather strongly associated with dental caries, and the number of years of education received by the mother also showed some association. Parents with high education had fewer children needing dental attention.

Distribution of children according to the number of times canned fruit was consumed in one week as related to def teeth was found to be significant ($r = 0.2$, $P < 0.05$).

The educational level of the parents was associated with the number of times per day the child brushed his teeth ($r = 0.3$, $P < 0.05$).

Notes on the teeth and gingivae of Central Australian aborigines

J. A. Cran. *Austral.J.Den.* 59:356-361 Dec. 1955

Clinical and bacteriologic examinations were carried out on 118 aborigines in Central Australia, by staff members of the University of Adelaide. These natives have been subject to detribalization for about ten years and are adopting civilized food habits. The change in food habits has been correlated with pathologic changes occurring in the teeth and gingivae.

The caries incidence is four times as prevalent (DMF of 1.2) in the group from 19 to 29 years old as it is in the group 13 to 18 years old (DMF of 0.3) and the group 6 to 12 years old (DMF of 0.37). The steep rise in caries in the group 19 to

29 years old is different from that found in civilized subjects, where the steepest rise occurs in the group from 6 to 18 years old.

Thirty-two of the 118 aborigines showed hypoplasia, and 38 showed fluorine hypocalcification. Thirty-six subjects showed marginal gingivitis and 39 showed hyperplastic gingivitis.

Although these subjects have been brought into a civilized environment, they not infrequently revert to primitive ways. The ill effects of a civilized diet are to some extent offset by eating habits such as vigorous chewing, their methods of cooking food, the presence of grit in their bread, and some natural food they hunt and gather. Valuable information can be obtained from a study of these factors, which can be applied in a modified form to prevent and treat dental disease in civilized subjects.

The effect of vigorous chewing of food of a harsh nature is to produce keratinization of the gingival epithelium and to stimulate a constant blood supply to the gingival tissues. The effects of attrition and a well-developed musculature are to facilitate the cleansing of the surfaces of the teeth.

The bacterial flora is mainly saphrophytic, consisting of organisms living in the saliva and the small amount of food debris at the gingival margin.

Oral phosphatase levels and caries activity

W. J. Carter, Kirk C. Hoerman, Harold R. Englander and Irving L. Shklair. *Science* 123:325-326 Feb. 24, 1956

Experiments were conducted to determine a possible relation between caries activity and phosphatases found in whole stimulated saliva. Fifteen milliliters of paraffin-stimulated saliva were collected from each of 100 Naval recruits taken at random, who ranged in age from 17 to 20 years. Similar saliva samples were collected from 26 caries-free and 26 caries-active individuals. The caries-free group was selected by clinical and roentgenographic examination. The caries-active individuals were selected clinically on the basis of the existence of ten or more carious lesions. A colorimetric method was used for the phosphatase determinations. The results are given in the table.

Table *Mean phosphatase activity per 100 ml. of whole saliva*

Group	Units of acid phosphatase	Units of alkaline phosphatase
Random	4.72	0.57
Caries-free	5.65	0.58
Caries-active	7.61	0.68

Statistical analysis of the differences in the mean acid and alkaline phosphatase levels for caries-free and caries-active groups did not reveal significance. The lack of correlation between phosphatase activity in the saliva and caries activity was ascribed to the presence of phosphatase in the many organisms normally present in the mouth.

A preliminary report on the solubility of decalcified dentine in water

Muriel G. Crabtree and H. F. Atkinson. *Austral.J.Den.* 59:340-342 Dec. 1955

During the course of some experiments it was found that human decalcified dentin was readily soluble in water at temperatures in the region of 100° C. This observation prompted an investigation into the relative solubility of decalcified dentin in water at different temperatures. It was considered that the temperature of beverages taken into the mouth might be sufficiently high to cause the solution of dentin decalcified during the carious process.

Initial experiments showed that decalcified dentin was soluble in water at temperatures between 40° and 60° C. The temperatures at which hot beverages are normally taken into the mouth vary between 45° and 75° C.

A series of experiments showed that decalcified dentin is soluble in water at mouth temperature, and that the solubility rate increases with rises in temperature.

The carious process involves considerably more than a simple acid decalcification and some proteolysis. It appears from these experiments that

decalcified dentin may be rendered soluble by temperature changes alone. It is conceivable that the temperature of beverages and cooked foods may play a part in the carious process, and that certain diets owe their apparent caries inhibiting properties to the fact that they are consumed cold as well as to their natural detergent effect.

Fluoridation: Teeth and politics

H. W. Nylund. *Commonweal* 63:462 Feb. 3, 1956

How far may public agencies be allowed to go in "doing things" to people for their own welfare? The community has a duty to treat its water against bacterial contamination and to assure a supply which will be harmless. The community has the right to insist on immunization against certain contagious diseases, on the grounds that the encroachment on personal liberty is outweighed by the public good. The proposal to fluoridate water may go farther than these measures. Water supply fluoridation is compulsory medication for a noncommunicable condition. Advocates or opponents should take cognizance of the principle involved, as well as of particular merits and risks.

A relationship between political conservatism and opposition to water fluoridation has been observed.

Nutrition

State of knowledge of metabolism of calcium and phosphorus (Estado del conocimiento del metabolismo del calcio y fósforo)

A. Chattas. *Rev. A. odont. Argentina* 43:482-492 Nov. 1955

Calcium and phosphorus are indispensable to man for the formation of bone and teeth, of which they are the main constituents. Almost the whole amount of calcium in the body (99 per cent) is located in the skeletal structures in the form of phosphates and carbonates. Of the entire amount of phosphorus in the body, 70 per cent is combined with calcium in the bones. Small portions of both minerals are present in the circulation or in the intercellular spaces. Calcium and phosphorus are supplied to the body by food, and they pass through the digestive tract into the blood serum from where they are ready to be absorbed by the bones and the teeth.

The periods during which the demand and consumption of these minerals by the organism are greatest are the intra-uterine life for the formation and calcification of deciduous teeth and the lactation period and early childhood for the formation of permanent teeth. A well-balanced diet, consisting mainly of milk and its products, eggs, fresh vegetables, and cereals, supplies the child with the proper amount of these minerals. It maintains calcium and phosphorus in the blood serum of normal children at a constant level and ready to be absorbed by the teeth. The metabolism of calcium and phosphorus in children depends on the diet of the mother during pregnancy and the health of the child. Disorders of the metabolism of these minerals in pregnant women reflect unfavorably on the calcification and normal formation of the teeth of the fetus. Likewise, systemic metabolic disorders of these minerals in children during lactation and early childhood result in deficient calcification of the teeth.

The deposition of mineral salts in the matrix during the formation and calcification of teeth takes place in stages. Enamel and dentin are extremely sensitive to tissue metabolic changes during the process of their formation. Any metabolic change that occurs during precipitation of mineral salts in the matrix causes harm to the cells of enamel and dentin. This injury shows later on in an enamel that is dull and dusty in appearance, and in interglobular dentin. Even hypoplasia of the enamel may result.

Prenatal calcification of the teeth shows in the enamel of infants by the neonatal ring. The infancy ring, which is formed in the tooth enamel when the child is about one year of age, shows postnatal calcification. During the first year of life infections are frequent and calcification of the teeth is poor. When the child is between the ages of 12 and 30 months, calcification of the teeth improves. It gets poor again when he is

between the ages of two and a half and five years. During the periods of poor calcification of the teeth, infants and children should be watched carefully with an aim at preventing decalcification. This is best done by supplying a well-balanced diet.

The study which the author made on the metabolism of magnesium and strontium facilitates an understanding of the etiologic relations between the disorders of the metabolism of calcium and phosphorus and the occurrence of imperfect calcification of the teeth. The study on the phosphatases gives a clear idea of the role played by a well-balanced diet in the prevention of osteodental diseases of deficient calcification which predispose to dental caries.

▼ Dental health education

Dental health education as a part of preventive dentistry

(Dental Health Education als Teilgebiet der präventiven Medizin)

Gottfried Michel. *Zahnärztl.Welt* 10:585-587 Dec. 10, 1955

Dental health education activities started in the United States two decades ago but are still relatively unknown in Germany.

Among the most important of such activities is the evaluation of caries incidence. One American investigation revealed that about 50 per cent of two-year-old children had caries, and that the DMF index of 16-year-old children was 7.69 as compared to 4.3 in Germany. This alarming caries frequency demanded immediate preventive measures. Dental health education must play an important part in preventing a further caries increase. Many public school teachers in America and in Germany are interested in participating in such a program.

The results of a rather small scale study made in New York, during which public school children were instructed by dental hygienists, proved that the amount of dental hygiene instruction alone cannot be decisive. An investigation of the motives which kept children away from periodic dental examinations revealed the following reasons:

1. Lack of understanding of the importance of dental care and hygiene was given by 1,308 children (52 per cent).
2. Complete indifference toward the condition of their dentition was determined in 206 children (8.5 per cent).
3. Economic reasons were established for 822 children (35.5 per cent).
4. Miscellaneous motives caused 90 children (4 per cent) to stay away from periodic dental examinations.

It also was established that more than 60 per cent of the children did not visit the dentist because their parents were not convinced of the necessity or were unwilling to cooperate. Success in preventive dental care, however, depends mainly on the cooperation of parents, teachers and dentists, and the action or reaction of children toward dental examination and treatment is of secondary significance.

Dental health education needs careful planning, intensive organization and visual aids. Direction of a preventive dental health program must be assumed by a health educator with special training in public and school health service.

To popularize such a program, a National Children's Dental Health Week has been organized every year in the United States, with the support of the American Dental Association and state dental organizations.

Dental educational material for parents, children, school and administrative authorities is published and distributed regularly. Lectures are given to parent-teacher's organizations, and can be listened to on radio or television. Full length films and film strips are shown, and illustrative booklets are made available.

The value of dental health education programs has been recognized in the United States, and their activity increases accordingly. The American Dental Association has established and advanced such a program, invested great amounts of money, and promoted the teaching of dental health education.

The value of a similar program for Germany and for other European countries would be enor-

mous. The beginning would be even easier, because in those countries a sufficient number of dentists is available. Such a program, however, can be successful only when it is centralized and adequately supported.

It is high time to start the dental health education program in Germany now!

Report of committee on mouth protection project

Gerard H. Schoen. *Bul.Nassau Co.D.Soc.* 30:12-14 Jan. 1956

Interest has grown in the prevention and treatment of injuries to the oral structures caused by contact sports. Injuries to the permanent teeth of boys in the 14 to 18 year old group are more difficult to manage than injuries to the teeth of older groups. The size of the dental pulp makes it difficult to prepare an anterior tooth for a porcelain jacket crown or bridge abutment.

The Nassau County Dental Society organized a test project, wherein the whole football squad in one high school was equipped with mouth protectors. Six other high schools, with comparable enrollments and football schedules, were used as a control group. An examination was made by a member of the committee in each of the seven schools.

The committee selected a soft rubber interdental splint fitted to the maxillary teeth as the best protective device. Two satisfactory commercial types consist of soft velum rubber, horseshoe-shaped devices with labial and lingual flanges that extend well up on the gingiva, with flat occlusal and incisal surfaces. In the trough between the two flanges is a substance that can be softened by immersion in boiling water. When the substance is soft, the appliance is fitted to the athlete's upper teeth and then chilled with ice water. The appliance retains its shape and is retentive. The excess may be trimmed so that it does not abrade the tissues nor impede speech any more than necessary. This type of appliance is not satisfactory in instances where the player has orthodontic bands or appliances. Because backfield players had to speak more clearly, latex protectors were made for this group.

Twelve latex rubber mouth protectors and 48 impression-fit mouth protectors were fitted to the entire football team. The work required five hours for one dentist and one assistant. The equipment included an assortment of deep upper impression trays sufficient to take the impressions for the latex rubber mouth protectors, a rubber mixing bowl and spatula, one container of bulk alginate material, a hot plate and sponge basin for boiling water, and ice water.

On completion of the football season, players at all seven schools were re-examined. Of the 60 players in the test school who wore interdental rubber mouth protectors, none suffered injuries to the hard structures of the mouth. Of the 335 players at the other six schools (91 of whom wore mouth protectors), 29 dental injuries occurred. The incidence of injury was 11.7 per cent for the 244 unprotected players.

Athletic directors, coaches and trainers had tended to minimize the number of dental injuries and to magnify the cost and discomfort of protective mouthpieces. After the results of the test project were publicized, they accepted the dental society's program.

A dental health campaign

F. J. Hastilow. *Brit.D.J.* 99:442-443 Dec. 20, 1955

A long-term dental health campaign has been launched in Birmingham, England. The cooperation of the Health Education and the Maternity and Child Welfare sections of the Health Department was obtained, after which a meeting was arranged to include representatives of all the dental bodies in the area—the School Medical Service, which includes the School Dental Service, the Birmingham Dental School, Central Counties Branch of the British Dental Association and the Local Dental Committee. These bodies were enthusiastic in favor of the campaign.

It was felt that in the present state of dental manpower, it would be harmful to emphasize the need for people to visit their dentist regularly, as this would only lead to numbers of frustrated potential patients. It was decided to concentrate on the dangers of sugar and the importance of

mouth cleaning. Stress was to be laid on the fact that sugar in any form between meals should be avoided and that means to clean the teeth and mouth immediately after meals must be adopted. These means should include use of a toothbrush, rinsing and swallowing, or finishing a meal with fruit or other detergent foods.

To reach a wide audience, three means were chosen: (1) talks in schools by dentists of the Local Authority, especially to senior children in grammar and secondary schools; (2) talks to interested organizations, particularly the Parent-Teacher's Association. The talks are given by the Local Authority dental surgeons or by general practitioners. Equipment and material are supplied by the Health Department; (3) health visitors, midwives and home nurses. These people have heard talks by members of the staff of the dental school, and it is hoped to arrange a visit to the dental hospital to give them some insight into preventive dentistry.

Posters, pamphlets and displays have been produced for use in maternity and child welfare centers, schools and school clinics. Future means of publicity to be investigated include articles in local papers, children's cinema clubs, local exhibitions, and special talks and films at maternity and child welfare centers.

▼ Statistical research

Statistical reliability in caries studies
(Kariestilastojen luotettavuudesta)

Aimo V. Rantanen. *Suomen hammaslääk. toim.* 51:136-147 Sept. 1955

Important in the evaluation of the statistical reliability of caries studies are the degree to which an investigative method applies to individual situations and the manner of gathering data and presenting results. The data and original values applied should be reproducible, and it should be possible to re-examine results. Most caries studies, even those related to the etiology of the disease, do not fulfill these requirements. The intensity of carious disease and its distribution at various times among various groups of people are usually expressed in general statistical terms or according to particular caries indices. Comparisons of the outcome in two investigations, unless the statistical reliability of the material is evaluated, may be misleading. The mean variation of the indices and the significance of the variation determine the reliability.

Dependable observations by other investigators, particularly in relation to incipient caries, reflect so much variation that they cannot be used in final estimates. To achieve uniformity of observation among different investigators or of the same investigator at different times is the problem. Careful examination of a single patient takes four to five hours, and even then a mean margin of error of approximately 2 per cent results.

The purpose of this study was to establish which factors influence the reliability of results. It was part of an extensive dental study conducted by the Student Health Service among Finnish high school seniors planning to enter college in the fall of 1949. It consisted of a rapid clinical examination (three to four minutes per patient) to register the presence of caries—the simplest kind of study. Two investigators worked two to three hours a day three days a week. For the examination, a dentist's chair was used. Each examiner had a recording secretary. Good over-all lighting, a sharp dental probe and an oral magnifying mirror were the sole aids. Caries were registered if the probe sank beyond the enamel or if inspection confirmed decalcification of the enamel.

After each investigator had examined 350 persons, two patients, each previously examined, were re-examined by the other investigator. Both examiners agreed on the state of 27 of the 32 teeth. In seven cases of incipient caries, however, only two were registered identically. Another patient—one with exceptionally bad teeth—was used for further verification purposes. Registration of 18 teeth—four impacted, four intact and ten with other defects—was identical. The registration of 14 other teeth differed, considerably in six instances and enough in three others clearly to suggest inattentiveness.

After these control tests, a conference was held to achieve a common basis and more uniformity

in registration methods. The patients were divided into groups of 40 persons. The mean error in observation of each group was computed on the averages of every fifth group. No statistically significant difference was noted between the registration of observations on the right or the left side of the mouth, although one examiner tended to register more observations on the right than on the left side and another examiner, vice versa. Some variations were noted also on the basis of the sex of the patient and that of the examiner. Accurate registration was not achieved until after 1,000 examinations had been completed by each examiner.

A proposal for unification and standardization of statistical methods used in measurements of dental caries

(Projet pour l'unification et standardisation des méthodes statistiques concernant la carie dentaire)

Louis J. Baume. *Rev.mens.suisse odont.* 65:1220-1230 Dec. 1955

Statistical methods used in caries measurements should include: (1) gathering and recording of data concerning the epidemiology of caries; (2) collecting and tabulating all facts concerning the needs in dental public health, and (3) investigating and testing all available methods for individual and mass control of caries.

The reasons for unification and standardization of statistical technics are as follows: (1) to obtain internationally reproducible methods; (2) to eliminate inadequate statistical procedures; (3) to establish comparable data and (4) to obtain conclusiveness in the evaluation of available caries prophylactics.

The desired unification should be based on clear definitions of all terms used, and the standardization should be based on internationally accepted and utilized procedures. All terms used should be defined according to their present usage in the American dental literature, and the statistical methods should be standardized differentially according to their purposes such as influence of diet, epidemiology, etiology and control, incidence (in different countries), resistance and susceptibility and public health survey.

The distribution of caries on different sites of the teeth in English children from the age of 2-15 years

G. J. Parfitt. *Brit.D.J.* 99:423-427 Dec. 20, 1955

The distribution of dental caries is of interest, for separate and independent factors influence caries on different sites of the tooth surface. The distribution of carious cavities in 3,000 English children at each age from 2 to 15 years was determined, together with the number of missing teeth. The results are presented in ten tables.

In the deciduous dentition the proportion of caries decreases as the teeth are shed. In the permanent dentition the proportion increases as the teeth erupt and are exposed to the influences in the mouth.

In the deciduous teeth of the upper jaw, the proportion of caries in the incisal segment is nearly as great as the occlusal caries, but in the permanent dentition it is much less. A greater proportion of caries occurs on the occlusal surfaces of the permanent teeth than on the occlusal surfaces of the deciduous teeth, but in both dentitions the lower teeth are the more affected. The incidence of proximal caries in the upper and lower buccal segments increases to a maximum at the age of seven years and then decreases proportionately with the caries incidence in other situations. In all other sites and locations in the deciduous dentition, the proportion of caries is greatest at the age of two or three years and decreases with age.

Below the age of eight years, the two most common sites of caries are the occlusal surfaces of the lower and upper second deciduous molars, and above the age of eight years, the lower and upper first permanent molars.

The caries rates of the lower second deciduous molars and first permanent molars are similar, but in the upper jaw the permanent molars have a slightly greater caries rate.

An analysis of occlusal surface caries shows that caries is most prevalent in the lingual fissures of the lower first permanent and second deciduous molars and least prevalent in the mesial fissures of the first permanent and first deciduous molars.

The greater amount of caries on the occlusal

surfaces of the lower first permanent and second deciduous molars appears to be caused almost entirely by the presence of four instead of three caries-susceptible areas, the caries incidence of the three homologous fissures being similar in the upper and lower teeth.

The cavities in each site on the teeth lost by caries are in the same proportion as in the teeth remaining in the mouth. The most carious teeth are lost first and show the highest number of cavities in each site per 100 teeth.

Proximal caries is the greatest danger to the life of the tooth; 61 per cent of the lower first deciduous molars and 49 per cent of the upper molars unquestionably are lost through proximal caries, for only proximal cavities were found on them; 11 per cent of lower and 24 per cent of upper molars have only occlusal cavities, which is in approximately the same proportion as the distribution of caries in these teeth.

▼ School dentistry

Iowa fights tooth decay through education

Elvira L. Grabow. *J.School Health* 26:88-95 March 1956

The Iowa Plan for Dental Health Education is an organized plan, based on the principles of education, prevention and correction, aimed at promoting better teeth for Iowa school children. A Bureau of Dental Hygiene was organized in 1927 and has continued since then its work in the public and parochial schools. The Bureau is sponsored jointly by the Iowa State Department of Health and the State University of Iowa. A factor in the success of the state dental health program has been the continued support of the Iowa State Dental Society.

The teacher is the key to success of the program. She teaches the dental health facts and presents them in such a manner that the pupils are led to favorable action. She gives the pupils reasons for proper nutrition, for good oral hygiene and for regular visits to the dentist. In her contact with parents, she stresses dental health and dental care as an important part of the general health program.

Early in the program a handbook for the teacher in the elementary grades was developed and has been revised from time to time. The new edition of the handbook stresses prevention through nutrition, good oral hygiene and periodic visits to the dentist. Stress is placed on reducing sweets in the diet. Whereas formerly emphasis was placed on brushing the teeth twice a day, today children are taught that the teeth should be brushed immediately after each meal. At lunch time when this may not be feasible, rinsing the mouth with water is suggested as a substitute.

Periodic visits to the dentist are encouraged through the use of dental cards which serve a number of purposes—pupil motivation, parental instruction, an annual or semiannual reminder for the dental examination, and as a record for the teacher. For the past four years a 55 per cent return has been averaged throughout the state for these dental cards.

Efforts are made to reach parents and the lay public with dental health education. Among the media used are exhibits at the state education meeting and the state fair, the observance of National Children's Dental Health Week, magazine articles, talks, and the use of films, slides, literature, posters, bulletins and television.

Each fall a bulletin is sent to the dentists, superintendents of schools, public health nurses, hygienists and the officers of many organizations. The bulletin describes new developments in dental health, outlines the procedure for a school to follow to participate in the Iowa Dental Plan, and contains a report from each school indicating the percentage return in dental cards.

One of the successful programs for the dental care of the underprivileged is that sponsored for the past eight years by the King's Daughters in a town of 11,000. One hundred and forty children were assisted in the school year of 1953 to 1954, at a cost of $1,200 to the organization.

Orthodontics and pedodontics

▼

Orthodontics

Direction of tooth eruption utilized in orthodontic therapy

(Die "Steuerung des Zahndurchbruchs" als kieferorthopädische Therapie)

Hans Brückl. *Deut.ZahnärzteKal.* 15:123-128, 1956

The problem of space maintenance in deciduous anterior teeth combined with an effort to decrease the caries frequency in the involved teeth influenced Kjellgren in the development of his "serial extraction" therapy and Hotz in his "direction of tooth eruption" method.

To utilize correctly the direction of tooth eruption, both mechanical skill and knowledge of biologic principles of the changing dentition are necessary. The treatment usually is carried out in the following stages:

1. If the incisors are too close to each other and the jaws are extremely narrow, the cuspids are extracted after all deciduous teeth have erupted.

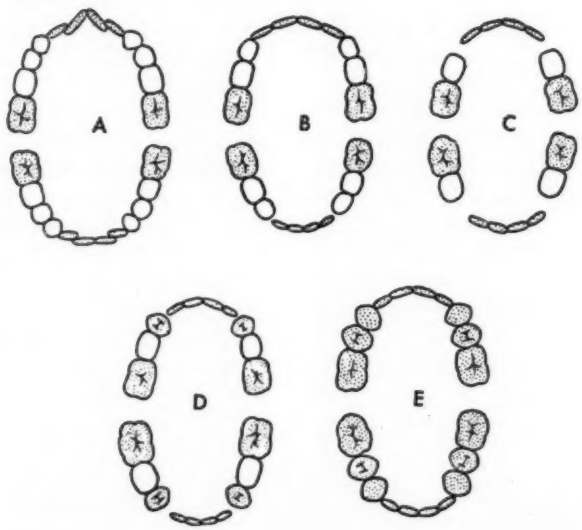
2. If the anterior teeth still are malposed after elimination of the cuspids, the central deciduous incisors are also extracted to facilitate eruption of the bicuspids.

3. When the bicuspids erupt malposed, their immediate extraction is indicated to allow normal eruption of permanent cuspids in correct position.

This guiding of tooth eruption results in a permanent dentition in which perfect spacing is obtained, although the number of teeth present has been reduced by four or more teeth. The permanent dentition will not only meet all esthetic requirements but will be more caries resistant.

In instances of pronounced distoclusion, the extractions should be limited to the upper jaw.

Figure 1 Stages of direction of tooth eruption (Hotz). A: Permanent incisors erupted in malposition. B: The deciduous cuspids were extracted. C: The first deciduous molars were extracted. D: The first bicuspids erupted in malposition. E: The first bicuspids were extracted. Cuspids and second bicuspids in correct position



Space maintenance in the mandible presents no problem because the mandible is wider than the maxilla. After extraction of the upper deciduous cuspids, the position of the anterior teeth will become normal. After extraction of both first deciduous molars (and later occasionally, both bicuspids), the upper permanent cuspids will achieve a normal relation with their opposing teeth. In the region of the permanent molars, however, a slight distoclusion often remains.

In instances of open bite, direction of tooth eruption can be utilized. After elimination of the malposed upper deciduous cuspids, the permanent anterior teeth can erupt and develop normally. The incisors can drift in lateral and lingual direction and obtain normal position gradually.

If there is a minor close bite or edge-to-edge bite, especially if carious lesions are present, direction of tooth eruption should be utilized. If overbite exists the direction of tooth eruption must be followed by orthodontic treatment.

The direction of tooth eruption is contraindicated if an extreme close bite is present.

The function of the deciduous dentition is mastication as well as maintenance of occlusion and space for the permanent dentition. Any interruption of natural tooth development makes subsequent orthodontic treatment necessary to restore the normal balance. The method of direction of tooth eruption should not be employed when the young patients are nervous, anxious or hypersensitive, because often up to 12 extractions are required.

At the Dental Institute of the University of Halle, Germany, Hotz's method of direction of tooth eruption has been utilized in 100 patients. The results obtained are as follows:

1. By a classical application of Hotz's method (extractions without subsequent orthodontic treatment), complete success was achieved in 24 per cent of the patients. Another 20 per cent showed considerable improvement.

2. In 43 per cent of the patients, the method, when combined with orthodontic therapy, obtained the desired correction.

3. In 14 per cent, even when incomplete direction of tooth eruption was utilized, there was such an improvement that further extractions were unnecessary, and a simple orthodontic treatment achieved the desired effect.

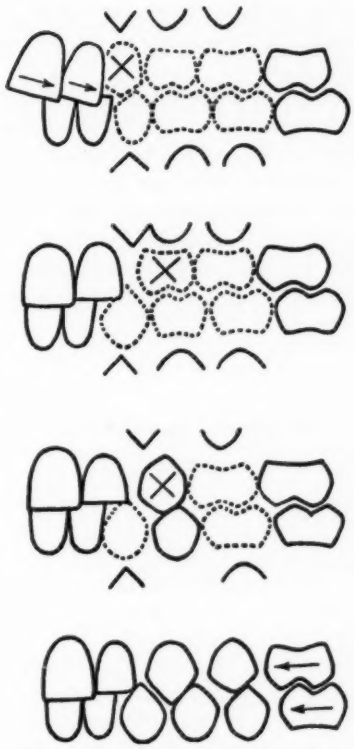


Figure 2 Direction of tooth eruption in distoclusion (four states)

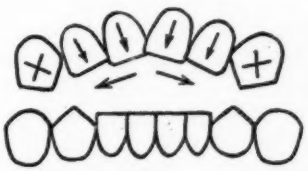


Figure 3 Direction of tooth eruption in close bite

Figure 4 Lowering of the bite after direction of tooth eruption

4. In the remaining 19 per cent, the treatment was discontinued because the patients did not return to the clinic.

Between 5 and 10 per cent of all dental anomalies can be treated with Hotz's method. Success on a larger scale can be achieved only after a more simplified technic has been developed. More time and research should be devoted to diagnosis of dental conditions to determine the need and the possibility of success for space maintenance through Hotz's method of direction of tooth eruption.

Nylon in orthodontics: an experiment

G. H. Roberts. *Brit.D.J.* 100:113-115
Feb. 21, 1956

A source of wasted effort in orthodontics lies in the breakage of both fixed and removable appliances. An indestructible appliance would be of great advantage.

Andresen developed from Kingsley's bite plate and Robin's monoblock the activator which is now in common use and practically unbreakable. A modification was evolved by Bimler (1952) and described by Eirew (1955). According to Bimler a hard, rigid activator tends to reduce rather than stimulate muscular activity because the muscles of mastication are reflexly inhibited when the teeth meet too hard an object. Bimler overcomes the inhibitory effect by rendering his functional appliances elastic. His appliances may be described as skeleton activators the components of which are joined by stainless steel wires. A Bimler appliance, however, involves some complicated wiring and is easily distorted unless the patient uses great care. Once distorted it may be difficult or impossible to repair.

Nylon has several properties which may be of use in orthodontics. Nylon is flexible, strong, with good dimensional stability, light, and resists fractures caused by constant stressing.

It was decided to treat a patient using a Bimler apparatus made entirely of nylon. The patient was a ten year old boy with neutroclusion and reverse incisor bite, crowded upper incisors and spaced lower incisors.

A wax bite was taken with the mandible in the most retruded position. Models of the jaws were articulated to the wax bite and a Bimler appliance then formed entirely in wax. This was sprued, invested, and the mold injected with nylon.

Before the appliance was waxed up, the incisors on the upper model were reinforced with plaster anteriorly and reduced to half their thickness from the palatal aspect with a mounted stone. The lower incisors were similarly treated except that their labial surfaces were reduced.

The appliance was fitted and the patient instructed to wear it at all times except at mealtime.

After two weeks the appliance was removed, the reverse incisor bite having been corrected and the spacing of the lower incisors largely eliminated. The upper and lower molars were not in occlusion. After four more weeks the upper and lower molars were again in contact but the upper molars were more forward relative to the lowers than they had been before treatment.

Although nylon has some disadvantages as regards absorption of mouth fluids and staining, research may eliminate these difficulties.

▼ Pedodontics

Dental evolution and disturbances during deciduous dentition

(Évolution dentaire et accidents de première dentition)

Raoul Dubois-Prevost. *Hygie* 1:19-21 Nov. 1955

Mothers always dread the day when the "first" teeth of their children erupt.

Usually the eruption of the deciduous dentition is blamed for all troubles and disturbances occurring during this period.

Dentists and physicians, however, know that the eruption of deciduous teeth plays only a minor part in infantile pathology and psychology.

Normal eruption of the deciduous teeth is accompanied by slight symptoms which usually are caused by the irritation to the tissues exerted by the teething process.

The development of dental germs is influenced by the mother's health and nutrition and the intraovarian environment of the fetus. The tooth eruption and the migration of the tooth toward the gingiva in the course of the calcification process is a complicated phenomenon which takes place simultaneously with the primary formation and the secondary development of both jaws. The tooth slowly progresses through the tissues and finally reaches its correct position.

The piercing of the tooth through the gingiva is the culminating point in dental evolution. From the beginning to the end of the period of eruption of his first teeth, it is only normal that the child is overtired, sensitive and irritable. The child suffers real pain. His gingiva is tight and constantly irritated. At the point at which the erupting tooth applies the maximum of pressure, the gingiva is whitish and the surroundings are overloaded with blood. In a hypersensitive child, "teething fever" may occur. Saliva drivels from his mouth. He refuses to eat and shows symptoms of an abnormally high temperature, acceleration of the pulse and increased restlessness.

Such disturbances during tooth eruption, however, are usually mild and disappear quickly.

Therapy is comparatively simple: slight local massage with aromatic syrup, and, if the disturbances are more severe, brushing the gingiva with a minute dose of iodized alcohol.

Before, during and a short time after tooth eruption, the child wants to bite everything within his reach. He should be prevented from biting unhygienic toys or other unclean objects. He should not be given such ridiculous rattles as usually are found in most infants' cribs but rubber rings which are manufactured especially for such a purpose. These rubber rings can be sterilized easily and daily.

When, in spite of such care, painful crises become more frequent, a physician should be consulted.

Before, during and after the period of tooth eruption, the children's teeth should be fortified by a wholesome, plain, varied and abundant diet, taken at regular hours. Mineral waters and milk should be added.

The mother's strength should be kept at the highest possible level, especially during the last three months of pregnancy and during lactation. Then and only then the child to be born will be a perfect baby in good health. His dental evolution will be normal, and no severe disturbances will occur during the period of the deciduous dentition.

Deformities following accidents occurring during infancy

(Unfallsfolgen während der Kleinkinderzeit)

P. Ascher. *Deut.zahnärztl.Ztschr.* 10:1878 Dec. 15, 1955

For the growing child, the esthetic appearance of the face is important. The preservation of deciduous teeth, traumatized or fractured by falls or blows, however, is of far greater significance.

Such accidents occurring during infancy and early childhood, especially soon after tooth eruption, may cause malposition of the deciduous incisors. An immediate repositioning by means of metal or wire splints often is contraindicated because a natural placement into the correct position still is possible.

Blows or falls may also cause the loss of teeth. The shifting of permanent teeth, erupting after an accidental loss of deciduous teeth (especially when the incisors are involved), is one of several factors which indicate the need for replacement. Sometimes favorable results can be obtained by reinserting the tooth into its socket. When the natural tooth is neither usable nor available, either the implantation of another tooth or the construction of a partial denture should be attempted. The bridge can be anchored by inserting supporting wires behind or around the neighboring teeth.

Prevention of space closure between the anterior teeth (especially in young patients) by insertion of prostheses is indicated for esthetic reasons, and to forestall malocclusions.

Occlusion should not be regarded as a single attribute but as a result of a combination of genetic and environmental factors. Because of the hazard in predicting the direction and rate of eruption of the deciduous and permanent dentition in children, and because of the fact that space maintenance is simpler to attain than space opening, the replacement of teeth lost in accidents should be done by conservative, preventive

orthodontic means. Accidents of this nature may damage the dental germs of the permanent teeth. The severity of such trauma depends on the degree of calcification and mineralization at the time of the accident. Nonmineralized parts may escape the traumatic impact.

After deformation by blow or fall, the child's tooth can be preserved only if the pulp will not be injured in the subsequent reconstructive treatment. A tooth in which root therapy has been performed too early or a tooth with a crooked root canal cannot be preserved.

Properly timed orthodontic therapy may intercept the development of malocclusions or moderate the severity of the results of accidents occurring during infancy or early childhood. Since success in such treatments shows a correlation to the tooth development, therapy should be timed to take advantage of the benefits of both tooth and body growth.

Relationship between tooth eruption and body growth in Sardinian school children
(Periodo di eruzione dentaria e costizione morfologica nei bambini di 6 – 7 anni)

Quirico Pittorru. *Minerva stomat.* 4:360-363 Nov.-Dec. 1955

The relationship which unquestionably exists between the eruption of the teeth and the development of the human organism is rarely mentioned in dental literature.

In 1910, Zambelli reported his observations of an abnormal tooth eruption in children in which the body growth also was subnormal. Morelli noted later a delayed tooth eruption in children who were built along shorter and broader lines than those of a normal figure (branchymorphic and branchytypical). He observed, however, little or no disturbances in tooth eruption of children belonging to constitutional normal groups.

Pende reported that tooth eruption is normal in children with thyroid hyperfunction and that it is abnormal (retarded) in children with thyroid hypofunction.

Pastore, in a series investigation of 333 girls between 6½ and 12½ years old, all attending public schools in Rome, Italy, found that both the deciduous and the permanent teeth erupted in the lower jaw before the corresponding teeth appeared in the upper jaw.

To verify whether a relationship exists between tooth eruption and body growth, 508 Sardinian school children (from six to seven years old) were examined at the Dental Clinic of the University of Cagliari, Sardinia, Italy.

The data in regard to the period of normal and abnormal tooth eruption then were compared with data in regard to normal and abnormal body growth. The fact that a low stature is one of the characteristics of the Sardinian population was taken into consideration.

The Pignet index (length of body minus combined body weight and chest circumference) was used when the comparison was made between phenomena occurring during the eruption period and those occurring during the developmental period of the body. Only the teeth which had erupted fully before the time of examination were considered in the conclusion.

The figures established by the Pignet index revealed that the majority of the Sardinian children display retarded corporal development. In nearly all instances, the tooth eruption was delayed. This delay seemed to parallel the retardation in body growth. Tooth eruption occurred later than usual and tooth formation also was delayed. Such a delayed eruption parallels the Pignet index more closely in girls than in boys.

Basic science

▼

Histology

The development of the epithelial attachment

Marie J. Ussing. *Acta odont.scandinav.* 13:123-154 Aug. 1955

No direct microscopic evidence of an organic connection between the enamel and the epithelium has ever been presented; that is, no definite structure connecting the two has been demonstrated. As the findings of James, Rygge, and Conklin and Stafne suggest that a separation between enamel cuticle and enamel epithelium may take place prior to eruption of the tooth in the mouth, the present study investigates this relation between the enamel epithelium and the enamel cuticle, prior to tooth eruption. Clinical and histologic data were compared, and supplementary examinations under the electron microscope were carried out. Before removal of the unerupted teeth from young persons, the strength of the attachment between the enamel and the soft tissue was determined. After removal, the teeth and their sacs were studied separately. Cuticular isolates were produced by acid flotation from tooth surfaces, and these isolates were examined either directly or after embedding and sectioning. Likewise the sacs were embedded and sectioned.

Clinically, it was not possible to demonstrate any connection between the crowns of the teeth and their sacs, which are attached to the teeth at the cementoenamel junction only. Histologically, the cuticular isolates appear to consist of a continuous membrane, the enamel cuticle, with attached epithelial cells, which in sections are identified as the cells of the enamel epithelium. The greater part of this epithelium is found attached

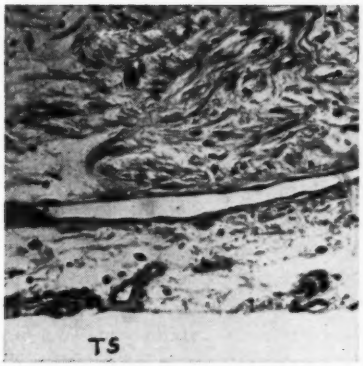


Figure 1 Section of a dental sac showing lack of epithelial lining at the tooth side (TS) and degeneration of the connective tissue

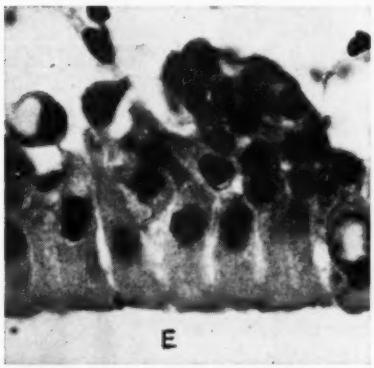


Figure 2 Section of a dental sac with an island of enamel epithelium lining the sac. The ameloblasts terminate freely toward the enamel space (E)

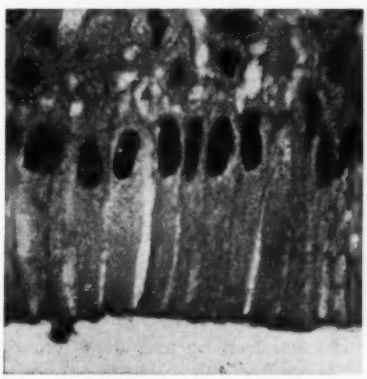


Figure 3 Section through a cuticular isolate, showing tall, columnar ameloblasts at the distal ends of which is a thin, continuous membrane

to the tooth surface indicating that the separation observed clinically takes place between the enamel epithelium and the connective tissue of the sac. In the connective tissue degenerative changes are observed pointing to a reduction in the cementing function of the connective tissue ground substance.

This observation suggests an explanation for the separation between the enamel epithelium and the connective tissue. The enamel epithelium consists of ameloblasts, stratum intermedium, and the outer enamel epithelium. To a large extent the ameloblasts retain their columnar shape. Degeneration of the ameloblasts takes place in two different ways; either by a gradual decrease in height, or by a quick positional change in regions closest to the oral mucosa. In the final stage the ameloblast layer together with the stratum intermedium appear as a stratified, squamous epithelium. Under the electron microscope, an organic connection is demonstrated between the ameloblasts and the enamel cuticle by way of submicroscopic fibrils. An organic connection between the enamel cuticle and the fibrils of the enamel matrix is suggested but is not directly evident in human material because of loss of enamel matrix during decalcification. In unerupted molars of mice, the enamel cuticle and the matrix fibrils are intimately connected. The thickness of the enamel cuticle is found to exceed 2,000 angstrom units or 0.2 microns. In apparently true cross sections of the cuticle, however, a cuticle thickness of 200 to 500 angstrom units is measured. Fibrils are seen passing into the enamel cuticle from the ameloblast side as well as from the enamel side. Furthermore, the cuticle is intimately connected with the enamel lamellae and the wedge-shaped defects in the enamel.

Innervation of newly formed connective tissue in the region of extracted teeth

(Innervazija novobrasovannogo utchaska desny na meste udalennogo suba)

M. A. Skuzkij. *Stomat., Moscow* 4:19-26 July-Aug. 1955

At the Dental Institute of the University of Moscow, the alterations occurring in the peripheroneural system after tooth extractions were studied on living dogs and human corpses.

The examinations were made on 176 extracted teeth from 36 young dogs.

Analogous studies were made on the teeth of human cadavers.

In both investigations, the regeneration of connective tissue was investigated on specimens, 1, 3, 7, 15, 30 and 60 days after tooth extraction.

The most substantial changes occurred in the axis cylinders of the nerve cells. These alterations were characterized by irregular contours, tinctorial deviations and neuroplasmic swellings. Three days after extraction, fragmentation of neurofibrils and lesions in the epineurium were observed occasionally. These changes occurred more frequently in medullated than in nonmedullated nerves near the extraction wounds. Under the electron microscope, thin, stripped and newly formed axis cylinders became visible; their branches reached and entered the connective tissue.

Regeneration of the nerves, however, could not be established at that time.

Seven days after extraction, the alveoli were covered with connective tissue which was interspersed with capillaries and completely epithelized. In the central region of the alveoli, a decomposition, and in the border regions, regressive and progressive changes of morphologic, neurocytic elements, occurred.

After 15 days, the innervation of the periodontium appeared to be more extensive than that of the connective tissue. The nerves of the connective tissue, although not developed completely, had neurilemmas and medullary sheaths; the axis cylinders in the periodontium still were without both. The regenerated tissue contained more nerve fibers but fewer differentiations than were normal before innervation.

After 60 days, the connective tissue was transformed partially to cicatricial tissue. The nerve fibers of the gingiva supplied nervous energy and

stimuli to the regenerated tissues. All these fibers were either in fascicular or reticular arrangement and were surrounded with connective tissue. All axis cylinders had both neurilemmas and medullary sheaths. The peripheroneural fibers ascended from the apical periodontium and were still primitive structures. They were arranged in small fascicles which gradually progressed toward the epithelium.

The innervation of newly formed connective tissue in the region of extracted teeth, established in animal experiments on dogs and verified in control tests on human corpses, can be found in similar studies on living human beings even ten years after tooth extraction.

Is reticular dentin an artefact?

(La dentine réticulaire est-elle artefact?)

M. A. Boucquet. *Ann.odontostomat.,Lyon* 12:143-148 June 1955

After intensive microscopic investigations on the structural synthesis of dentin, Grosjean, Jaccard and Périer believed that the classical conception of canalicular structures should be revised. These scientists reported that the dentinal structures, similar to those of enamel, consist of loosely arranged coexisting prisms. This was manifested and clearly observable in the border region between pulp and dentin by a correct angle of incidence of the light rays (Kerebel).

The electron microscopic picture of these structures varies according to the changes in the fine focalization. The seemingly reticular structures which are predominantly visible in the peripheral parts of the field of vision, do not correspond with the microscopic picture obtained by sharp focusing.

In the interpretation of the prismatic structures observed in transverse sections, the interprismatic substance appears thinly stratified. In longitudinal sections, however, a wide interprismatic stratum can be observed. There seems to be a considerable contradiction between the reported results obtained by observation of transverse sections and those achieved by observation of longitudinal sections.

If reticular dentin exists, why can this formation not be detected in the transverse sections? In instances of severely calcified teeth in which the canaliculi are extremely fine and the elementary substance compact, no reticular dentinal structure can be observed either by electron microscopy or by ultramicroscopy. These reticular formations are visible only in pictures made with the phase microscope of the regions in the vicinity of the pulp but not in those of the border region of the enamel where the dental canaliculi are less compact.

It is possible that the seemingly clear manifestation of reticular dentinal structures in cauterized specimens is caused by a decomposition of calcium salts in regions of insignificant calcification of organic substances, for instance, in the vicinity of widened dentinal canaliculi, and that therefore only an artefact occurs, an artificial structural alteration that is not natural but has been caused by chemical or mechanical changes during processing.

▼ Anatomy

Growth changes in the glenoid fossa

James H. Scott. *D.Practitioner* 6:117-120 Dec. 1955

At birth the human glenoid fossa is approximately circular in shape, measuring about 9 mm. in its greatest anteroposterior diameter and about 10 mm. in its greatest mesiolateral diameter. It is a shallow depression with a slight peripheral rim, which may show a small tuberclelike elevation in the region of the future postglenoid tubercle. Medial to the tubercle the rim of the fossa is deficient, and here its posterior boundary is the petrotympanic fissure. The anterior segment of the rim may take the form of a low mesiolateral elevation, which is the earliest indication of the articular eminence. At birth the eminence is poorly developed.

The fossa at birth lies at the side of the cranium and faces more in an outward direction than downward. A small outer portion is related to the posterior root of the zygomatic process, and a

larger inner part lies on the outer surface of the squamous plate of the temporal bone below the level of the zygomatic root and separated by a thin plate of bone from the middle cranial fossa.

The glenoid fossa lies in close relation to the tympanic membrane, from which it is separated by the low anterior part of the tympanic bone.

In the adult the glenoid fossa comes to face downward, as in fetal life. The change in position from the condition at birth is not caused by any change in form of that part of the squamous temporal bone which makes up the side wall of the skull. It is largely the result of a relatively greater development of the outer zygomatic portion of the fossa. At birth this forms less than a third of the fossa; in an adult skull it forms the outer half of the fossa. Growth of the zygomatic portion involves both the anterior and posterior roots of the zygomatic arch. The posterior root comes to project outwards from the side wall of the skull, forming a shelf separating the outer region of the glenoid fossa below from the lower border of the temporal muscle above. The anterior root of the arch in its growth produces the greater part of the articular eminence.

There is also some growth at the inner part of the fossa at the temporal side of the sphenotemporal suture, and a great development of the tympanic bone.

If an adult temporal bone is held to a source of light, a translucent region is usually seen in the roof of the fossa. Here the bone between the glenoid fossa and the cranial cavity is thin. This region corresponds in size and position to the greater part of the fossa at birth. It faces outward and downward. The thicker bony regions around this thin central part which make up the articular eminence, the zygomatic shelf, the inner wall of the fossa, and a strip of denser bone in front of the petrotympanic fissure, all come into existence after birth and almost entirely as a result of surface deposition of bone.

The growth of the glenoid fossa is closely correlated with that of the condyle of the mandible. The condyle attains its adult form at about six years of age, and at about this time the articular eminence has become a well-developed ridge. By about the time of eruption of the permanent molars the distance between the inner margins of the two condyles has reached almost to adult size. The increase in the distance between the mandibular condyles from birth to adult life is correlated with the separation of the glenoid fossae.

It would appear that the form of the fossa is partly determined by that of the condyle, that the distance between the condyles is largely secondary to growth changes at the base of the cranium, and that the development of the articular eminence is related to the pattern of movements occurring at the temporomandibular joint.

▼ Anthropology

Reduction phenomena of the lateral incisor

(Yläleuan toisen inkisiivin reduktioilmiöistä)

Aimo V. Rantanen. *Suomen hammaslääk.toim.* 51:155-163 Sept. 1955

The permanent human denture has a number of characteristics which have come to be regarded as signs of the reduction tendency. The shapes of teeth seem to become less complex, their size remains below average and deficient numbers are noted more often than are supernumerary teeth. The change toward decreasing size and diminution in numbers may be noted most often in relation to the third molar, the second bicuspid and the upper lateral incisor. In the lower jaw, the central incisor exhibits these characteristics most often, but they are particularly clear in relation to the upper lateral incisor. Many investigators have considered this a sign of a trend in phylogenetic development, which in time would leave the human denture with but two upper incisors. The original count in this group of teeth has been mentioned as six, possibly even ten.

The concept has gained support from the fact that these anomalies are often transmitted by inheritance, although the mechanism of inheritance remains to be explained. Numerous investigators have indicated, moreover, that these anomalies tend to appear along with other ectodermal disturbances. Clarification of this reduction phenomenon with respect to the upper lateral incisor has become a fascinating topic of investigation, both

from an anthropologic and an ethnologic standpoint.

A preliminary study has been made of the reduction of the upper lateral incisors among 2,200 Finnish university enrollees, examined in 1949. Attention was focused on the congenital absence of the tooth from the denture or its appearance in a clearly atrophied form. In about 2 per cent of those examined the records showed the complete absence of the upper lateral incisor or the presence of a peg-shaped tooth. Both types of anomaly were encountered about as often on the left as on the right side and with approximately equal incidence in both sexes.

Fossil research questions Darwin evolution theory

Robert K. Plumb. *New York Times* 105:1, 7 March 10, 1956

Man was well along the process of evolution some 10,000,000 years ago, re-study of a double handful of fossil fragments found in northern Italy in 1872 suggests. The fragments include a lower jawbone complete with teeth. An account of the fossils and the theory they suggest was presented by Johannes Hurzeler, curator of vertebrate paleontology of the Natural History Museum in Basle, Switzerland.

Dr. Hurzeler, and Helmut de Terra, research associate in the Columbia University department of geology, said they were confident they had found a direct ancestor of modern living man 10,000,000 years old and that it was not a side branch of man.

The 10,000,000 year old jawbone, about the size of a jawbone of a seven year old child, is fixed in shiny black coal known by geological standards to be 10,000,000 years old. The fragment is preserved beautifully. The teeth are shiny. Every fold and ridge on canines, premolars and molars can be examined with a microscope. The jawbone is that of a creature that could be called a humanoid, an ancestor of man and one well along in evolution. The creature had a short face as opposed to the snout of an ape. It had no "simian gap," a characteristic space in apes between adjacent teeth and the canines. The front teeth are more nearly vertical in the jaws; the front teeth in apes point out. The canine teeth are smaller than the big canine teeth of apes. The chin is rounded on the front instead of sharp. The nostrils are ascending instead of flat as in apes. The cheek bone rises just above the canines instead of beginning at the second molar, as in apes. The lower three molars are characteristic of man and not the apes. The mental foramen is present.

The fossil, which came from the Province of Tuscany near the North Italian Mediterranean coastline, was found close to well-preserved remains of ancestors of modern animals and plants that are known to be 10,000,000 years old.

For the first time, on the basis of this fossil, science is able to pronounce man an "old" inhabitant of the earth. Heretofore it had been assumed that man and the apes separated some time between a few hundred thousand and a few million years ago. The new finding upsets the accepted timetable.

The two scientists speculate that if man and the ape had a common ancestor, it was neither a man-ape nor an ape-man, but a creature with the characteristics of neither a man nor an ape. It may have lived 100,000,000 years ago.

When the fossils were found in 1872 by a French paleontologist, they were mistakenly identified as those of an extinct type of mountain ape. Dr. Hurzeler and Dr. de Terra will go to Italy in an attempt to find more fossils.

A people without disease
(Ein Volk ohne Krankheit)

Walther Müller. *Bl.Zahnhk.,Zürich* 17:19-20 Feb. 1956

Many reports published in the international scientific literature describe the unusual state of health, the ease, comfort, contentment and long life of the Hunzas. Their small country lies on a 4,500 foot high, hardly accessible, plain, surrounded by the more than 20,000 foot peaks of the Himalayas in the northwest frontier of Kashmir. The plateau is inhabited by about 10,000 Hunzas who speak a Sanskritic language and belong to a Mohammedan sect. They live in several small villages. The language is scarcely related to any language

spoken today. This fact allows no other conclusion but that the Hunzas have lived for more than 1,000 years in complete seclusion from the outer world.

Their diet consists of vegetables and fresh fruits. The relatively large population living in such a small area necessitates an almost complete abstention from food for about six weeks yearly.

The Hunzas are so healthy that their language has no term for "disease" or "sick." An examination of the dental condition revealed no single instance of caries. Although the Hunzas usually sleep on cold stone floors, rheumatism is unknown. Among the Hunzas, physicians and dentists would starve or prepare for another profession.

The question as to why the Hunzas enjoy such an excellent state of health and why most of them reach the age of 100 is discussed frequently by explorers, anthropologists, medical and dental researchers and other scientists. As usual, there are as many opinions as there are authors. Some assume that hereditary factors, not present in other species of man are active; others feel that the Hunzas' unusual way of living, eating and temporary fasting is the probable cause. There is no doubt that the Hunzas are a happy people.

Modern man, however, has no justification for his complaint regarding his susceptibility to disease, his tensions, his moral, mental and physical troubles and disturbances. Modern man and his civilization have brought suffering and hardship on himself.

▼ Pathology

Significance of a furred tongue

I. S. L. Loudon. *Brit.M.J.*
No. 4957:18-20 Jan. 7, 1956

Although belief that a furred tongue is a sign of disease is both old and widespread, little seems to be known of the causes of furring. Gans (1954) concluded that a furred tongue is as common in health as in disease, and is therefore of no clinical significance.

The tongues of all patients seen in general practice over a period of about six months were examined, until the facts on 700 patients had been collected. For each patient the state of the tongue, the diagnosis, the presence of fever, the bowel habits, the smoking habits, and the state of the teeth were recorded. In the control group of 100 patients, furring was found in 12 per cent and a clean tongue in 55 per cent, with 33 per cent in the intermediate group. When the group was analyzed for smoking habits, it was seen that most of the people with furred tongues were moderate or heavy smokers. This tendency for smoking to produce a furred tongue was found constantly throughout the investigation. The conclusion from the control group is that in healthy people only about one in 20 will have a furred tongue unless the person is a smoker, in which case the chance of having a furred tongue is greatly increased, and increased in proportion to the amount smoked.

Furring of the tongue can occur simply as a result of a fever, regardless of the cause, but infections (other than that of the respiratory tract) do not cause furring in the absence of fever, with the exception of infections of the mouth. Eleven instances of ulcerative stomatitis and two of dental abscesses were seen, and in none of these was the tongue clean. Dental decay, however, even when gross, was not found to produce furring of the tongue.

Furring of the tongue is most common in infections of the respiratory tract, in fever, regardless of the cause, in local infections of the mouth, and in heavy smokers. There is no evidence that disease of the gastrointestinal tract produces furring unless the disease happens also to cause a fever. In particular, there is no evidence of any connection between constipation and a furred tongue.

Most instances of furring of the tongue are caused by one of three conditions: local infection, a dry mouth, or the irritant effect of tobacco smoke. Local infection may come from the mouth itself (as in stomatitis), or from the nose or throat (as in tonsillitis, colds and sinusitis), or from the lungs (as in bronchitis and pneumonia). Dehydration of the mouth may result from a general

state of dehydration, or from the dry mouth of a fever, or from blocked nose. Smoking presumably acts by the direct irritant action of tobacco smoke on the tongue.

Furring of the tongue is produced by some local change from normal conditions, and not by a change in the condition of the stomach, large bowel, or any other internal organ. Thus the value of a furred tongue as a clinical sign is distinctly limited.

Causes of malformations in man and animal

(Von den Ursachen der Missbildungen und Missbildungskrankheiten)

F. Büchner. *München.med.Wschr.* 97:1637-1677 Dec. 16, 1955

That heredity is one of the main causes of malformations occurring in man and animal has been established by recent investigations conducted at the Pathologic Institute of the University of Freiburg, Germany. The report of these examinations emphasizes, however, that, besides hereditary factors, environmental influences are active in the development of defective and abnormal formations. Changes in the female reproductive cell may cause deformities which appear later in the children.

In human beings, a close relationship has been revealed between virus diseases occurring in pregnant mothers and malformations appearing in their newly born babies. The highest number of children with severe deformities were born of women over 40 years old. The fewest of such anomalies were found in children born of women between 21 and 35 years old. Women below the age of 20 years have an only slightly increased number of malformed babies.

First born children show an increased tendency toward malformations, also the sixth child and the children born afterwards. Deformities seldom occur in infants born between the first and the sixth child.

The hereditary factor in certain familial diseases, such as hemophilia, marble bone disease, cleft palate and cleft lip, cysts and many dental abnormalities, may originate in the chromosomes of the paternal or maternal germ cells. It can be proved statistically that the maturity or immaturity of the female ovum is responsible for the rarity or frequency of malformations. Therefore, it can be assumed that the pathogenic significance of the ovulogenous condition is based on disturbances of the respiratory process during the preplacental period.

The origin of malformations caused by lack of oxygen and glucose has been demonstrated in tests using cold-blooded and warm-blooded vertebrate animals. The results obtained in these animal tests can be duplicated in human beings. Disturbances of the respiratory process interrupt the macromolecular synthesis in the ovum. Such a synthesis can occur only under oxidasic metabolism at a normal intensity.

The inhibition of oxidation by paralysis of enzymes may also lead to malformation. This fact has been established in animal tests. By observation of human patients, the same relation between an inhibition of oxidation and the origin of malformation can be demonstrated.

Early diagnosis of poliomyelitis: colored triangles appearing on the hard palate

(Gaumendreiecke und Frühdiagnose der Kinderlähmung)

W. Wilde. *Landarzt* 32:21 Jan. 10, 1956

An early diagnosis of poliomyelitis can be made by the determination of viruses as the causative factors appearing in either the alimentary canal or in the pharynx.

According to Thiele's theory, a still earlier diagnosis is possible by observing the appearance of unique orange-colored triangles on the hard palate. Dentists are in a position to recognize such phenomena during periodic examinations.

The author investigated the validity of Thiele's theory, and found epidemic appearances of ochre, red or orange triangles on the hard palate as early signs of a forthcoming outbreak of poliomyelitis.

When ochre-colored triangles appeared, the consequent poliomyelitis was comparatively mild. Red triangles, however, characterized an infectious attack with severe complications. These red triangles were observed in seemingly healthy per-

sons when poliomyelitis in epidemic form appeared in the neighborhood of the patient's residence.

Orange triangles are signs of a forthcoming mixed infection of the sporadic and epidemic types of poliomyelitis.

In all instances in which these unique triangles appear on the hard palate, it is important to investigate the blood count immediately to determine whether an unusual increase of either monocytes or neutrophilic leukocytes (stab forms), or both, are present.

The author's investigation, therefore, not only verified Thiele's controversial theory but demonstrated the possibility of establishing the danger signs of an outbreaking of poliomyelitis in seemingly healthy dental patients. Because the dentist's early observations can be checked by blood counts, two different diagnostic methods are available to control poliomyelitis before it metastasizes to the central nervous system, a course which usually leads to severe paralysis.

A case of dwarfed supernumerary teeth

(Un caso de dientes supernumerarios con enanismo)

José Martínez Cano. *Rev.españ.estomat.* 3:441-446 Sept.-Oct. 1955

An interesting dental anomaly was presented by a patient who came to the Odontological Service of the Sacred Heart Hospital at Barcelona complaining of some supposed thorns that were embedded in the gum and moved when he ate, making mastication painful. On examination, they were found to be very small supernumerary teeth that had erupted at the level of the second bicuspid on the upper left side. The patient was unable to fix the time of their appearance. Roentgenologic examination showed no anatomic or pathologic condition that might have been responsible for the development of the supernumerary teeth. After extraction, the smaller of the two, which had undergone decalcification, was found to have the normal structure of an adult tooth.

Embryologic research seems to show that the anomalies of dental development fall into two large classes: (1) those caused by proliferation of the inner layer of the epithelial sheath and (2) those caused by proliferation of its outer layer. In the first, the new structures are an extension of the tissues of the tooth that is the site of the anomaly; in the second, the new structures originate outside the epithelial sheath and are connected with the tooth by vestiges of the evaginated epithelium. Other theories have been suggested to explain these anomalies, but this one, which is held by the school of Prague, has the advantage of synthesizing the rest and establishing a relationship between them.

Rare tumors occurring in the maxillofacial region

(Seltene Geschwulstbildungen im Mundhöhlen-, Kiefer-und Gesichtsbereich)

A. Lindemann. *Ärztl.Praxis* 7:23-25 July 1955

In an examination of many types of dermatosis, the American dermatologist, John T. Bowen (1857-1941), discovered a unique true carcinoma, characterized by an unusually rapid progress which led to the patient's death within three months. The etiology of this type of carcinoma is unknown. Probably, it was a precancerous dermatosis, marked by a formation of pinkish papules or tubercles and covered by horny strata. Such a peculiar form of intra-epidermal carcinoma is now termed Bowen's disease. It is a definite clinicopathologic syndrome. The common practice of using the term Bowen's disease to designate all forms of squamous cell carcinoma *in situ*, wherever its location may be, is inaccurate.

Certain types of Bowen's disease occur in the oral cavity and in the maxillofacial region. They are characterized by solitary vicious centers and focal infections which appear simultaneously and which run together in the region of the lips and the mucous membrane. For the differential diagnosis it is important to observe whether the formation of the vicious centers or the inflammations caused by focal infections occur in different stages, and whether they progress to other locations when the primary lesions seem to be healed. By degeneration of cell complexes, this type of carcinoma becomes malignant.

Numerous reports in dental and medical literature describe the course of this disease, and propose to classify this type as Bowen's carcinoma. An essential difference exists between Bowen's carcinoma and Bowen's disease which is a precancerous dermatosis.

Bowen's carcinoma progresses rapidly even if intensive roentgen ray or radium treatment is used. Therapy is usually unsuccessful. When degeneration of the cell complexes has caused a malignant condition, it is too late to eliminate the vicious centers by radical surgery.

Behçet's syndrome, usually occurring in middle-aged men, is characterized by recurrent ulceration of the genitals, aphthous lesions in the oral cavity, uveitis and iridocyclitis followed by hypopyon. This condition appears without warning symptoms in seemingly healthy persons. The ulceration in the oral cavity makes the intake and absorption of food painful. Behçet's syndrome usually heals without severe scar formation. Simple scar formation, however, may develop into an indurated process which can lead to malignancy. The etiology of this syndrome still is unclear.

Local therapy usually is unsuccessful. Temporary improvement can be achieved by antibiotic or sulfonamide treatment. No success has been reported from the use of roentgen ray or radium treatments.

Diverging sex-morbidity trends in cancer of the mouth

A.D. Hitchin. *Brit.M.J.* 4947:1089-1090 Oct. 29, 1955

The correspondent, commenting on an earlier article on the same theme, observed that no reference was made to the possible effect of dental treatment on the prevention of carcinoma of the mouth. Of the local aggravating causative factors, oral sepsis and mechanical irritation, particularly in men, cannot be ignored.

The large amount of dental treatment carried out by the dental branches of the Armed Services from 1939 to 1945 may result in a lower incidence of cancer of the mouth among men.

Since 1923, a steadily increasing proportion of the dental profession has qualified academically. Among those concerned with oral care, there has been an increasing awareness of the dangers of oral sepsis and mechanical irritation, and a growing tendency to design prosthetic restorations on biologic principles. The education of more dental surgeons and improved dental health education would contribute to the prevention of oral cancer.

▼ Pharmacology

Streptonivicin (Albamycin): a new antibiotic: preliminary report

William J. Martin, Fordyce R. Heilman, Donald R. Nichols, William E. Wellman and Joseph E. Geraci. *Proc.Mayo Clin.* 30:540-551 Nov. 16, 1955

Streptonivicin is a new antibiotic which is very active against *Micrococcus pyogenes in vitro* and *in vivo*. The new antibiotic is produced by an actinomycete, *Streptomyces niveus*. An important current problem in the treatment of infectious disease is the management of infections attributable to strains of *M. pyogenes* that are resistant to many antiobiotics.

Preliminary studies with this new antibiotic agent were conducted at the Mayo Clinic.

There apparently is no cross resistance between streptonivicin and penicillin, streptomycin, chloramphenicol, the tetracycline group of compounds, neomycin, bacitracin, and erythromycin, and organisms resistant to them may be fully susceptible to streptonivicin. Laboratory evidence indicates that *M. pyogenes* can become resistant to streptonivicin. Streptonivicin was effective in the treatment of an experimental infection with *M. pyogenes* in mice. The drug is bound extensively by serum proteins.

Streptonivicin is absorbed into the general circulation when orally administered. Detectable levels in the serum after oral administration persist beyond 12 hours. These studies indicate that streptonivicin is distributed in blood, pleural and ascitic fluids, and thyroid tissue, and is excreted

in the bile, urine and feces. Under the conditions of the study, streptonivicin was not detected in cerebrospinal fluid.

The studies should prove of some value in the outline of treatment and interpretation of results which might be obtained after the use of streptonivicin in the treatment of the infections owing to organisms susceptible to its action.

▼ Physiology

Positions and movements of the lower jaw
(Alaleuan asennoista ja liikkeistä)

Harry Sicher, Chicago. *Suomen hammaslääk. toim.* 51:148-154 Sept. 1955

Still disputed and unresolved in the anatomy and function of the lower jaw are its central position and the roles played by various muscles in jaw movements. Since some of the misunderstandings stem from the absence of universally accepted terminology, the following objective definitions are offered:

1. The lower jaw is at rest when it is relaxed and the muscles are in a tonic state of contraction; the torso, standing or sitting, is upright; the eyes are focused in the distance, and any movement that disturbs this position of the head and neck tends to shift the lower jaw from its resting position. At rest, the incisors are 2 to 5 mm. apart, the lips lightly closed. Since muscle tone normally is relatively habitual, the position of rest is more or less the habitual position of the lower jaw.

2. Positions of occlusion are those in which the teeth meet—median occlusion, right and left lateral occlusion and protruded and retruded occlusion. Few would question lateral or protruded occlusion, but some would dispute retrusion from a position of median occlusion. Yet people with complete normal dentures can usually effect a 1 mm. retrusive movement.

3. The hinge or end-hinge position of the lower jaw is one from which its rotation axis is determined. In this position the lower jaw is back as far as it can be drawn by the action of mandibular muscles, and it is therefore an unforced position.

4. The central position is one of physiologic equilibrium, with the teeth in normal bite relation and the joints and muscles of the lower jaw in harmony. It is therefore the "ideal" position and with normal dentures it should be identical with median occlusion. The relations of the condyles of the lower jaw to the temporal bone are among the commonest causes of dispute. Clinical measures are here disregarded, since clinically good outcome proves merely that the method applied merits approval but can hardly be accepted as scientific proof.

One school of thought assumes the merging of the central position with the end-hinge position and considers maximal free retrusion the ideal position of the condyle in the socket. This school, by its very definition, denies the possibility of any normal retrusion by the lower jaw and similarly cannot accept its abnormal retrusion. Theoretically, it is hardly likely that a joint as loose and mobile as that of the jaw would be in extreme position during normal function, settling thereafter to median occlusion. Such a position would deprive the joint and its ligaments of those very margins of adjustment and safety which they might be expected to have. Related to this theory would be the scarcely believable argument that the lower jaw in persons with complete dentures, if retrusion is possible, is abnormally protruded. Retrusion, after all, may be observed in most young adults whose dentures—all things considered—can hardly be classified as ideal.

Attempts to study the "normal" person by means of all known anthropologic aids have not been made. Instead, the theory that median occlusion and the hinge position are the same is based on determining the hinge axis and then fitting the results to clinical use. Satisfactory clinical results have led to the conclusion that the hinge position is the ideal position of the lower jaw and that the central position is therefore one of maximal retrusion. Choice of the word "retruded" suggests that the retrusion of the lower jaw has been divined. The crux of the matter is the technic by which the hinge axis and the hinge position are determined.

It has often been said that a ½ inch to ¾ inch hinge movement is possible, but it is misleading

not to add that this movement is at the same time unnatural, forced and learned. The hinge position of the lower jaw is in reality its maximal retrusion, effected by the person's own muscular action; to assume, however, that the hinge position is the "ideal" central position of the lower jaw is both unjustified and highly unlikely. No conclusive evidence exists that the central position of the lower jaw is the position of maximal free retrusion.

Electromyography greatly intensified the study of movements of the lower jaw. Interest in its use has been greater than has been the critical evaluation of the technic. Results must be studied in the light of what is already known of muscular physiology. Electromyography registers the action potentials of a muscle, disclosing when and how powerfully a muscle acts. It does not, nor can it, show the form that muscular action takes. Muscles may contract isotonically and isometrically. In contracting isotonically, they shorten but retain their tension; contracting isometrically, they become tense but do not shorten. In isotonic contraction, muscles function as motion initiators. Isometrically they hold on, stabilize or set into position. There is also the muscular contraction that precedes the relaxation of muscular tension and its purpose is to impede or to keep in equilibrium the motion-initiating contraction that is antagonistic to it.

After more consideration of muscular action, it is concluded that an unsolved problem remains: What muscle opens the jaw?

Phosphorus and calcium exchange in the hard dental tissues in experimental avitaminosis B_1 in the dog

E. V. Vorovskii. *Stomat., Moscow* 6:16-20 Nov.-Dec. 1955

Evidence that avitaminoisis B_1 promotes caries, whereas the supplementation of vitamin B_1 lowers susceptibility to caries, yields no information on the mineral exchange in dental tissues when avitaminosis B_1 exists. A study was conducted to evaluate the rate of mineral exchange in hard dental tissues by means of tracer elements.

Observations of phosphorus and calcium exchange in the hard dental tissues normally and in the presence of induced avitaminosis B_1 were made in the dog. To eliminate factors influencing the mineral exchange, the comparative studies were made in the same group of animals. To measure normal phosphorous exchange, 60,000 to 90,000 impulses of radioactive phosphorous (P^{32}) per minute per kilogram of body weight were delivered by injection into each animal. Teeth were extracted under local anesthesia at intervals of 2 hours, 24 hours, 8, 15, 25 and 35 days. After disappearance of radioactivity from the dental tissues had been confirmed, the animals were given vitamin-deficient food. When avitaminosis B_1 became evident, an identical dose of P^{32} was injected, and symmetrically placed teeth were extracted at identical intervals.

Calcium exchange was studied by injecting 20,000 impulses per minute per kilogram of body weight of radioactive strontium (Sr^{89}), which behaves like calcium in the organism. Four dogs of the same litter, grown in a like environment, were used, one serving as a control. Under local anesthesia, the identical teeth were extracted from each animal at intervals of 2 hours, 24 hours, 7, 14, 28 and 35 days. All soft tissue was removed, and the teeth were washed until all traces of radioactivity disappeared from the water. The teeth were dried to the point of constant weight and divided into the anatomic components—enamel, cementum, root dentin and crown dentin. The radioactivity of each part was measured with a Geiger-Müller counter. To evaluate the rate of mineral exchange, relative degrees of radioactivity were measured. The radioactivity of the tissue reflected the absorption rate when compared with the total radioactivity of the injected substance, allowing for the natural decrease; specific radioactivity represented the speed of regeneration of tissue components, since it reflects the quantity of mineral in the tissue. To secure specific radioactivity on the basis of the absorption rate, the volume is broken down into milligrams of mineral per gram of tissue analyzed.

To produce avitaminosis B_1, food containing all available vitamins, including B_1, was autoclaved. The autoclaved diet was alternated with a synthetic sucrose-casein diet. The avitaminosis syndrome consists of reduced body weight, absence of appetite, vomiting, intestinal disturbances, general weakness and such motor disturb-

ances as unsteady gait and ataxia. The pyruvic acid content of the blood, which the vitamin B_1 level regulates, rises. Proof of avitaminosis was the animal's rapid response to intramuscularly injected vitamin B_1. Within hours, the dog responded to the environment, began to walk and began to eat with relish the autoclaved food it had rejected before injection. The pyruvic acid content of the blood abruptly dropped to near-normal level. Within days, weight gain was noted, though it never reached its original level.

Subcutaneously injected P^{32} and Sr^{89}, detectable in varying quantities in all tissues, was most concentrated in the dentin of the crown and least concentrated in the enamel. Sr^{89} was more speedily absorbed than P^{32} and, in the enamel, its level gradually diminished, whereas that of P^{32} increased, reaching its peak 13 to 18 days after injection. Sr^{89} was most highly concentrated in the cementum on the seventh day, whereas P^{32} reached maximal concentration after 18 to 25 smaller quantities.
days. Cementum absorbed twice as much Sr^{89} as P^{32}, although it originally was injected in much

Sr^{89} absorption in the dentin of the crown reached its peak within a day, whereas P^{32} took 15 to 28 days. Quantitative differences became apparent within two weeks, the level of Sr^{89} being twice that of P^{32}. Sr^{89} and P^{32} levels in the root dentin were maximal at 7 to 13 days, but quantitative differences were significant, two or three times as much Sr^{89} as P^{32} being detectable after an equal interval.

Absorption rates in avitaminosed and normal animals were comparable, being greatest in the root dentin and diminishing in the dentin of the crown, the cementum and in the enamel, in that order. These tissues are about as active in phosphorus exchange as are those of the normal tooth. The rate of P^{32} absorption in avitaminosed animals was one and a half to two times higher than in the control animals.

The greater the specific radioactivity of phosphorus in avitaminosed tissues, the more rapidly the phosphorus is regenerated. Comparison disclosed that all avitaminosed dental tissues absorbed more Sr^{89} than do normal tissues. In the enamel of normal and avitaminosed animals, Sr^{89} absorption rates were at their peak within 24 hours of injection. Immediately, and notably on the seventh day, avitaminosed enamel absorbed considerably more Sr^{23} than the enamel of normal animals. The dentin (root and crown) in the avitaminosed animal absorbed more Sr^{23} than in the normal animal, and absorption was maximal later in the presence of avitaminosis. Maximal absorption normally occurred within 24 hours, but was not attained until the fourteenth day in the avitaminosed animal. The deciduous teeth were exfoliated and the permanent teeth erupted significantly later in the avitaminosed animal than in the animal given food of full nutritional value. The exchange of P^{32} in dental tissues affected by avitaminosis B_1 appeared to resemble that in carious dental tissue; in both instances more P^{32} was absorbed than was observed in normal dental tissue.

The uneven distribution of salivary calculus in the mouth

Frank G. Everett. *J.Periodont.* 27:50-51 Jan. 1956

That salivary calculus is most frequently and most heavily deposited on the lingual surfaces of the lower incisor teeth has been observed by most clinicians. Various theories have accounted for the predilection of salivary calculus for this site, and a further possible theory is presented.

The sense of taste comprises four special chemical senses, distinguishing sweet, sour, salt and bitter. Depending on which of the four primary modalities is prevalent in the ingested food or drink, definite patterns of intraoral coordination are practiced. When eating or drinking sour foods or liquids, a person instinctively brings the tip of the tongue rather heavily in contact with the tips of the lingual surfaces of the lower front teeth, sealing off the lower parts of the lingual surfaces of these teeth from contact with the acid liquids; in short, sour liquids are sipped.

The lower lingual aspect of front teeth is thus protected from contact with the sour materials, that is, acids, thereby possibly favoring the formation of calculus.

Prosthetic dentistry

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Complete dentures

Technique for packing and staining complete or partial denture bases

Howard B. Johnson. *J.Pros.Den.* 6:154-159
March 1956

Complete dentures and partial dentures with labial flanges are improved esthetically by reproducing the natural contours of the gingiva surrounding the teeth in their flanges, and by tinting the acrylic resin bases to simulate the color of living tissues. The procedure described is a modification of the one suggested by Pound. The technic allows the operator to observe his results while he is staining the resin, and it avoids the danger of crazing acrylic resin teeth by the monomer as the stains are applied.

The denture is waxed up and contoured. The wax pattern of the flange can be stippled by tapping it with a stiff, short bristled brush or by crumpling tin foil into a ball and pressing it against the softened surface of the wax. The first half of the flasking procedure is carried out in the usual manner.

With the acrylic resin in place on the cast in the bottom half of the flask, the portion of the resin to be stained is visible. The teeth remain in the top half of the flask because they were separated from the resin during the trial packing by the sheet of rubber dam.

The objective of staining is to simulate the colors seen in the living tissues. The stains are dusted into position. After the powder is placed, it is moistened with monomer from an eye dropper with a no. 19 gauge needle attached.

The light yellow stain is placed first (Fig. 1). It may be used full strength or toned down by adding a third of the white stain to it. It is placed at the gingival margins at the position of each tooth, and is particularly strong over the cuspid eminences. None is permitted on the interproximal gingivae. The powder is placed opposite four teeth at a time, starting in the molar region. Each segment is moistened with monomer before the powder is applied to the next segment. The stain should be approximately 0.5 mm. thick.

Figure 1 Where to place the yellow stain

Figure 2 Where to place the lavender stain

A small quantity of lavender stain E is mixed half and half with stain H and is placed at the gingival margin in the same manner (Fig. 2). The pink stain is placed in the same manner and in the locations indicated (Fig. 3), and the deep red stain is used on and near the borders and at the positions of the buccal frenulums (Fig. 4). Red nylon fibers (included in the staining kit, which is manufactured by the Kay See Dental Manufacturing Co., Kansas City, Mo.) are mixed

Figure 3 Where to place the pink stain

Figure 4 Where to place the deep red stain

with clear acrylic resin powder and placed in a salt shaker. The entire labial surface is covered with this mixture and moistened with monomer.

The acrylic resin that goes into the retention holes of the teeth is wet with monomer. The stone in the top half of the flask is painted with a second coat of a tin foil substitute. The flask is closed carefully in such a way that the stained portion of the resin does not scrape on the stone of the top half of the mold.

The resin is cured in the usual manner, separated, and a minimum of polishing is done. The amount of stain and its distribution are matters for judgment, and should be based on close observation of a patient's gingival tissues as well as of the stained denture in the mouth. A stained denture in the hand will seem to have extreme coloring, but in the mouth the coloring blends with that of the mucous membrane and all artificiality disappears.

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Crown and bridge

Accurate models for crown, bridge and inlay construction with the double impression technic

(Präzise Abdrücke nach dem Doppelabdruckverfahren speziell für stufenlose Präparationen und Herstellung exacter Modelle für indirekte Kronen-Brücken-und Inlayarbeiten)

Ewald Stahl. *Deut.Zahnärztebl.* 10:46-52 Jan. 22, 1956

The double impression technic is indicated in the preparation of cast dentures, bars and splints used in orthodontic treatment and in the construction of dies, crowns, bridges and inlays. This technic, if carefully applied, secures the proper relation between die and adjoining and opposing teeth.

A customary plaster impression is taken, showing the coronal portions of the teeth and the line of deflection between soft tissues of the oral vestibule and the immovable mucosa covering the alveolar crest. After the plaster is set, the impression is removed in sections which are reassembled accurately in an impression tray. The second impression is taken with compounds of the new German impression materials "Silone" and yellow "Permaflexil." Comparison of the impressions with the dental condition of the patient will establish the relation between the model and the mouth. During the second impression taking, the tray is carried occlusally until the bases of the denture are imbedded. Both compound and "Silone" are chilled; to check the accuracy of the transfer, a silver wire can be attached, and the trial denture can be verified for fit on the natural teeth. If the fit is satisfactory, the cast with the dies is seated in the previously prepared wax bite, and mounted on the articulator.

In instances in which several abutments have to be prepared at the same time, and different patterns have to be made, or in instances in which it seems to be impractical to use copper or amalgam dies, the prostheses should be constructed indirectly by utilizing the double impression technic. The procedure is simple, and the equipment needed is inexpensive.

A tube of regular hydrocolloid material (if neither "Silone" nor "Permaflexil" is available) is cut in half (about 1½ inches long). Both parts are separately mixed with about 10 cc. water which is brought to the boiling point and kept at that temperature for about five minutes. After cooling, both parts are poured into glass ampules. One part is applied to the preparation with a syringe having a 16 or 18 gauge hypodermic needle. The material must be kept constantly at the temperature of 140° F. The material not used immediately can be sealed and stored for future use.

After the abutment teeth have been prepared, the second impression is taken. A tray with undiluted hydrocolloid (or "Silone") is carried to the patient's mouth and held firmly. When chilled and slightly cooled, the impression is removed and the compound around the prepared and neighboring teeth eliminated in order to allow space for the material in the prepared region. The impressions are compared with the patient's oral condition. If satisfactory, individual dies can be made.

The indirect double impression technic has the

following advantages: (1) the impression material can be kept at a comparatively high temperature, thereby reducing the internal strain; (2) the impression taking causes less discomfort to the patient; (3) the adaptation of the impression material to all margins is assured by the accessibility of those margins; (4) the preparation, contouring, carving and finishing of the cast retainer is effected before the patient's next appointment; (5) failures in casting (usually caused by air bubbles) of one impression can be corrected without recalling the patient, and (6) some of the procedures can be delegated to the dental assistant, thereby saving the dentist's time. The double impression technic is especially recommended in prosthetic constructions for hypersensitive patients.

▼ Miscellaneous

The role of cephalometrics in prosthetic dentistry

Robert M. Ricketts. *J.South.California D.A.* 24:19-30 April 1956

Cephalometrics was reported in 1930 almost simultaneously by Broadbent, an orthodontist, and Hofrath, a prosthodontist. Both methods consisted of obtaining a true lateral roentgenographic image of the head, capable of duplication at a later date. The cephalometric procedure is described.

Cephalometrics can be a useful tool to the prosthodontist. Each face has its own characteristics and these can be classified by the application of cephalometric procedures. A clear definition of the basic structures of the jaws and the base of the skull is available in the head film. The teeth can be related to the bony framework of the face in all dimensions. The relationship of the lips, tongue, soft palate, throat walls and the hyoid bone can be evaluated and correlated to the various occlusal problems.

Many functions of the mandible can be measured. The interocclusal dimension of the freeway space can be determined.

Even though the clinician does not subscribe to prevailing theories, cephalometrics is a tool whereby he can evaluate his own technic and treatment philosophy. The clinical use of cephalometrics should lead to better treatment prescription and prognosis.

The cephalometric head film does not permit a visualization of the condyle-fossa relationship because of the superimposition of the dense structures of the petrous portion of the temporal bone. The method of laminagraphy permits the visualization in a prescribed plane of parts otherwise obscured by dense structures. Hence, a lamina or layer or a body section similar to a histologic section is made of the predetermined area. Applying the same cephalometric technics to laminagraphy provides a true lateral image of the condyle and fossa, capable of being measured. It includes the denture and the joint simultaneously.

In the study of any structure of the body, the normal is learned through the study of the abnormal. Distinct types of joint disturbances occur as a result of four distinct conditions of the teeth and jaws.

A cephalometric record permits treatment procedures to be evaluated.

The interest of the prosthodontist and the dentist should not be limited to the teeth and mastication. The functions of speech, respiration, posture and psychodynamics are equally important. A better interpretation of all these functions can be obtained through cephalometric procedures.

Large-scale controlled cephalometric and laminagraphic studies have not been conducted on prosthetic patients. The variety of treatment technics and mechanical theories should be investigated by prosthodontists.

Operative dentistry

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Inlays and fillings

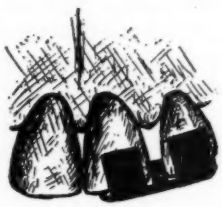
Notes on gold fillings

D. Hattyasy, Szeged, Hungary. *Brit.D.J.* 100:160 March 20, 1956

To preserve the front teeth, the best, and consequently the cheapest, method is the cohesive gold filling placed at the earliest possible age, and at the first sign of a carious lesion.

To facilitate this type of gold filling, the author has invented a small silver block with two pairs of wings, which holds the separated teeth in position during the filling, to give ample space, especially in the marginal region. This block is applied between the incisal edges of the tooth to be filled and its neighbor, completing the separation of the teeth. The gingival margin (which, according to G. V. Black, is the weakest point in a gold filling) is laid bare and is accessible to the operator.

The well-condensed, cohesive gold filling, and most certainly also the tin-gold filling, are the ideal fillings, particularly for small cavities in the front teeth. The gold filling is not out of date, it is merely out of practice, having been supplanted by more convenient and easier methods of minor value.



Possible harmful effects of cement fillings

(Darstellung der Theorien über die Schädlichkeit der Zementfüllungen in menschlichen Zähnen)

Eleonore Kleefeld. *Wissenschaftl.Zschr. Univ.Greifswald* 4:367, 1955

The problem of the increasing frequency of dental focal infection has induced many dentists to conserve, whenever possible, the vitality of the pulp. To prevent invasion and development of dental foci, an early and regular observation of the deciduous dentition is as necessary as the utilization of nonirritating filling materials.

Irritating filling materials can injure the pulp by their acid components and electrolytic effects. Acidification, contraction and deficient density of the filling material can be prevented by (1) mixing powder and liquid in correct proportion; (2) keeping the temperature uniform during mixing, and (3) obtaining an optimal condition for crystallization.

All silicate liquids, being essentially aqueous solutions of phosphoric acid, are hydroscopic. When exposed to air, the liquids take on or give off water. This increase or decrease of water (which greatly affects the setting time of the cement) occurs when the cement liquid is exposed to air during withdrawal of the liquid from its container, or during the mixing of powder and liquid. The influence of atmospheric conditions on the mixing of silicate cements can be eliminated by mixing in airtight containers. This procedure permits the mixing of a comparatively large quantity of powder with an adequate amount of liquid to produce a usable cement consistency under extreme temperature and humidity conditions.

The selection of the correct filling technic also is important. Only after cleaning and desiccating (with air syringes) and under a physiologically appropriate pressure, should the filling material be inserted in the cavity. Histologic changes in the pulp, not only the presence or absence of inflammatory reaction but also morphologic alterations of odontoblasts or their adjacent cells, must be taken into consideration.

The biologic condition of the tooth, especially

that of its pulp, is as important as the dimension and topographic position of the cavity. Calciotraumatic reaction of the dentin to fillings, accompanied by various injuries of odontoblasts, often remains unnoticed.

Future investigations of possible harmful effects of silicate fillings and of the technics used will lead to improved and precise standards of evaluation which will permit a more accurate comparison of the effects of different filling materials.

The case for gold foil

Allison G. James. *J.South.California D.A.* 24:19-21 Jan. 1956

There appears to be a trend in dentistry today to allow an interest in the study of biologic considerations to overshadow the study of restorative procedures and to relegate the latter to a subordinate position. The heart of dentistry lies in restorative procedures. The ideal of dentistry lies in prevention. Effective restorative dentistry is a great factor in prevention.

A gold foil restoration, where properly indicated and where properly placed and finished, constitutes the most permanent and enduring restoration of missing tooth substance possible. The procedures of gold foil fillings as propounded and practiced today differ from those used 30 years ago, although the basic principles as outlined by G. V. Black many years ago still hold. Substantial advances in cavity design and preparation have been made. These advances were possible because of the availability of new instruments of a delicacy, refinement and quality unknown years ago.

Patients experiencing their first gold foil restoration become enthusiastic, especially when they discover that gold foil restorations need not be conspicuous.

A good gold foil operator is a good dentist. Practitioners who have received adequate instruction in gold foil study clubs should improve their cavity procedures for all types of restorations.

The use of gold foil should be taught in the schools, should be encouraged by the profession and should be fostered by the Boards of Dental Examiners.

▼ Rehabilitation or equilibration

Clinical considerations in occlusion

L. Laszlo Schwartz. *New York D.J.* 22:3-7 Jan. 1956

The rapid technical developments in restorative dentistry are introducing a new danger into dental practice—the danger of overtreatment. Although the value of extensive restorative procedures in the treatment of serious dental disorders cannot be questioned, the dentist should deliberate before undertaking a radical course of treatment.

Dental and medical colleagues at the Columbia-Presbyterian Medical Center are trying to understand the function of the masticatory system by studying its dysfunction. Although adjuncts such as roentgenography and electromyography are used, main reliance is placed on the clinical examination. In a current study of over 500 patients at the temporomandibular joint clinic, it has been found that the onset of temporomandibular joint pain and dysfunction is often associated with occlusal alteration, either by grinding or restoration. There is no evidence that any particular type of treatment is responsible; the patients had gone to various dentists who favored different methods of treatment. It appears that any occusal change may have precipitated the symptoms. The observations suggest that sound clinical judgment is the most important consideration in occlusion.

An articulator is a useful device in the hands of a dentist who is capable of using it without being blind to its limitations. Articulators and the mechanical hypotheses on which they are based cannot solve the complex clinical problem of occlusion. Knowledge, judgment and skill are of greater value to the dentist called on to face problems in occlusion than any rigid hypothesis coupled with the most adaptable articulator.

Professional activities

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Practice administration

Establishing just fees for patients

Lloyd H. Dodd. *J.A.D.A.* 52:325-331 March 1956

Factors which enter into the setting of just fees for patients include the value of the dental health service to the patient, the public welfare, fair remuneration to the dentist, prevailing fees in the community and the establishment of good public relations. Although fees are only one factor in good practice administration, they constitute an important factor meriting much consideration.

The recent graduate must first determine his cost of practice—the cost of education and the cost of equipment. Fixed expenses such as rent and salary can only be estimated and cannot be determined definitely until the dentist has been in practice for two or three years. The total amount of the cost of education and equipment, added to the current office expenses and divided by office working hours, will give the hourly overhead. This amount should be amortized at approximately 4 per cent each year for 25 years.

The average number of working days per year is 250. If the average productive hours are estimated at six per day, there are 1,500 productive hours per year, or approximately 125 productive hours per month.

Before a fee is quoted, a thorough diagnosis should be made, a history obtained and the patient's story heard. The fee is based on the type of dental health service rendered, the technical skill required and the time consumed. The approximate fee should be determined by consultation between the patient and dentist prior to beginning the service.

The dentist may provide service at less than cost for two types of patients: (1) charity cases and (2) professional people.

Outstanding ability of the dentist in most circumstances should bring commensurately higher fees.

Neither an hourly fee nor a set fee is always fair. All fees should be on an individual basis, but within a limited range. Fees should never be quoted over the telephone, but should be discussed frankly and unhurriedly in the dentist's office. Fees should not fluctuate like the stock market but should be gradually adjusted to meet changing living conditions and should vary in different communities.

Appointments broken without ample notification should be charged for on the basis of the actual time lost. When appointments are broken inexcusably, the dentist is entitled to fair remuneration. When the patient has a legitimate excuse—for instance, illness, or death in the family—he should not be charged for a broken appointment.

Generally, full fees should be charged for children's dental work. The dentist should acquire the pediatrician's attitude toward the child.

A level of fees which allows quality service in all instances, even though not complete service, which allows the dentist and his family to live on at least the average scale of the patients in the community he serves, should be regarded as minimum, fair and just.

Applications of practice administration in general dental practice

A. J. De Santis. *Bul.Virginia D.A.* 32:16-34 Nov. 1955

The aim of practice management is to explore possible methods of providing more and better dental services for more people, and of allowing the dentist an equitable return in professional, personal and financial satisfaction. The dentist not only must be technically and scientifically proficient, he must acquire the nontechnical skills of conducting a professional practice.

A dental office for general practice should include a reception room, darkroom, laboratory, toilet facilities, a minimum of two operating rooms, and a consultation space or room with a desk at which the dentist and patient may sit

while the dentist presents a plan of treatment. If the dentist treats children, the reception room should include evidence to that effect, such as a child's table and chair set. A bulletin board in the reception room, on which current literature, important dental events and notices are displayed, is useful for patient education. Subdued music is optional in the reception room and desirable in the operating room. Dental offices should be neither too elaborate nor too modest.

The practice of dentistry has become so complex that the dentist should delegate some professional and nonprofessional duties to auxiliary personnel. Of the 32,000 dentists who operate alone, some are not aware that by employing one dental assistant the patient load may be increased 37 per cent, and by employing two assistants the patient load may be increased as much as 69 per cent.

The dental assistant should control the appointment book.

The dentist might set aside a morning and request those patients who have broken appointments to come in at that time on a first come, first served basis.

Once a month the dentist should hold a business meeting with his staff, to review office policies, personal problems and future plans.

Dentists, like other professional people, frequently develop compulsive personalities. To counteract the psychologic strains of dental practice, the dentist should seek in his free time activities that provide him with a sense of gratification and successful accomplishment. To supply motor activity, the dentist might engage in golf, hunting, boating or swimming. Other leisure time activities helpful to dentists include photography, painting, wood work, gardening and membership in civic organizations, church groups and service clubs.

Each dentist should follow a continuous program of patient education, conducted for the most part by word of mouth. While presenting a plan of treatment, the dentist can use visual aids and other educational material to good effect. The patient education program should not only encourage early and complete dental care, but vigilance and maintenance. The office policy of periodic recall should be explained.

In the first interview a complete case history—including medical history, dental history, personal history, last visit to dentist, chief complaint, fears, prejudices, attitudes and temperament—should be secured.

Each dental office should have several plans of payment, including a deferred payment plan. The office should acknowledge patient referrals, should send condolence and get-well cards, and should send letters thanking patients if they have been prompt with payments. A recommended text for such a letter is given.

Dental fatigue

K. McAllister. *Brit.D.J.* 100:60-61
Jan. 17, 1956

The reorientation of general practice toward conservative treatment has accentuated the problem of dental fatigue. Many factors add unnecessarily to the strain of dental work—the not fully utilized chairside assistant; needless extra steps or reaching movements; instruments not in their appointed place, and postural strains and eye strain.

The operator should do nothing himself which could be delegated to someone else. Initial time and thought in the training of the dental assistant is necessary to obtain the best results.

Cabinets and accessory tables should be within easy reach without moving from the chair side. Dental chairs often are not used fully with regard to height, horizontal position and rotation. An easy means of adjusting the height of bracket tables is desirable. A means of washing the hands adjacent to the chair obviates many trips a day to the wash basin.

The most important cause of dental fatigue is working standing up. Several varieties of operating stools offer the benefit of taking the weight off the feet and legs. The freely mobile stool with a back rest has much to recommend it.

Another important cause of dental fatigue is eyestrain. Probably the best form of shadowless illumination is provided by the little-used headlamp which gives a beam of light at all times parallel with the line of vision, whatever the position of the patient's or operator's head, and which leaves both hands free.

Advantage should be taken of all magnifying

aids. A spectacle frame is available with mounted magnifiers specially adapted for use in dental work.

It saves time in a one-man practice to have two surgeries similarly arranged with full sets of instruments in corresponding drawers, and two dental nurses. More than three-quarters of an hour daily can be saved in this way. This is, roughly, four hours a week or 30 operating days a year.

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Trade and laboratory relations

World federation of dental technicians

W. A. Warrington. *D.Technician* 1:1-2 Jan. 1956

In the autumn of 1955 the Yugoslav Dental Association invited dental technicians from all countries to join in forming an International Federation of Dental Technicians. A meeting was held December 4 and 5 in Belgrade. The countries represented were Yugoslavia, France, Sweden, Greece, Poland and Great Britain. The delegates agreed that such an international federation was necessary. Each national body of dental technicians would be asked to nominate representatives to form an *ad hoc* committee to meet in Paris in six months to form a federation and lay plans for the first Congress. It was agreed that English would be the official language and that *The Dental Technician* would publish the official bulletin of the federation.

Letters were received from the following countries pledging support: United States of America, Austria, Holland, Mexico, Brazil, Turkey, China, Finland, U.S.S.R., Hungary, East Germany and Japan.

A statement of aims, drawn up by a steering committee, reads in part: "... We are interested, by virtue of being specialists, in the development of dental prosthesis within the limits of the laboratory, and . . . we must count among our tasks that of contributing to progress and adding to the knowledge of science in this domain as well as that of popularizing new developments in every country."

That the interests of the proposed organization extend beyond that of laboratory technics is indicated in the statement of aims, as follows:

"We propose to include in our programme, as a common aim, the struggle to maintain peace and to give our support to all efforts directed towards peaceful co-existence between peoples, regardless of their social or political background, their race or creed.

"The World Federation of Dental Technicians should also be affiliated with the World Health Federation and with UNESCO and should work in close collaboration with these international organizatons . . ."

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Civil defense

The role of the dentist in an atomic disaster and the effect of atomic bomb radiation on the oral cavity

A. A. Hassan. *Egyptian D.J.* 1:3-8 Oct. 1955

An atomic disaster would create a medical problem of major proportions. The ability of the dentist to cooperate in solving the medical problem might determine the survival of the nation. Most of the casualties will result from blast, flying debris, and flash and secondary burns—the same types of casualties that are caused by all wars, but in significantly larger numbers. Radiation will account for only 10 per cent of the casualties.

American civil defense officials estimate a single first-aid station would require about 200 people to care for 600 wounded people in 24 hours. Nearly 100 such stations would be required to care for those injured by one bomb the size of the one dropped at Hiroshima. Thus more than 20,000 living and uninjured first-aid workers would be needed to recover from a disaster situation resulting from one small atomic bomb.

It is an accepted fact that there will be a serious shortage of physicians and other health service personnel to cope with the medical problem resulting from atomic attack. The dentist must play a key role in such an eventuality. The dentist, be-

cause of his professional education, has a knowledge of anatomy, physiology, pathology, pharmacology and anesthesia. His professional activities provide experience in treating patients in pain and shock, in controlling hemorrhage, and in giving anesthetics and prescribing drugs. The nature of his profession provides the dentist with a digital dexterity which enables him to master unfamiliar procedures quickly. With training and application, the potential value of the dentist can be increased manyfold. Such training would provide an additional source of professional health personnel to participate in the recovery from an atomic disaster.

Lesions in the oral region are of clinical importance in persons subjected to atomic radiation, in the third to the sixth week after the explosion. A grayish film appears in the posterior pharynx, which is followed by necrotic hemorrhages in the mucosa. Ulcerations often appear over these hemorrhagic lesions. Other ulcerations appear over the tonsillar regions and spread to the tongue. The gingiva becomes hemorrhagic and ulcerated. The tissue destruction may spread to the buccal membrane to involve the entire cheek and give the appearance of gangrenous stomatitis. The picture is similar to that of leukemia or aplastic anemia, and most patients die.

▼ History

The homes of the Odontological Society and their associations (1856-1900)

C. Bowdler Henry. *Proc.Roy.Soc.Med.* 48:977-982 Nov. 1955

The history of the Odontological Society, first of London and later of Great Britain, is linked with that of the diploma of Licentiate in Dental Surgery, Royal College of Surgeons England; with that of the first dental school in the British Isles, called the London School of Dental Surgery, and with that of the charitable institution associated with it, the Dental Hospital of London. The founders of the society drew up a curriculum leading to a professional diploma, and this necessitated the establishing of both school and hospital.

A century ago the Council of the Royal College was antipathetic to any form of exclusive specialization among its members. Yet the Memorialists of 1843, led by John Tomes, brought so much influence to bear that the College became persuaded not only to recognize dentistry as a department of surgery (when carried out by those holding the M.R.C.S. diploma), but created a new class of diplomates, in whose curriculum two fifths of the surgical subjects had been replaced by dental ones.

The Memorialists, so named because of the large number of memorials which they submitted to the Royal College of Surgeons and elsewhere, originally numbered about ten members. Their efforts were not immediately successful. Having been unsuccessful when working as a noncorporate group, these men decided after their last memorial of November 1855 to incorporate themselves with the following objects in view: To draw up plans for a school and a dental hospital; to formulate a curriculum of study; and, in the event of a further rebuff from the College, to hold examinations under the title of the British Institute for Dental Surgery.

On October 27, 1856, they met at the home of Samuel Cartwright to form the Odontological Society. After long negotiations, a clause was inserted in the Medical Act of 1858, granting the College "power to institute and hold examinations for the purpose of testing the fitness of persons to practice as dentists . . . and to grant certificates of such fitness."

In the same year, 1858, a committee was appointed by the Odontological Society to draw up plans for a dental school and hospital, which were established at 32, Soho Square. In 1860 the first examination for the L.D.S.R.C.S.Eng. was held, in which the Board of Examiners was composed, as now, of one half general surgeons and one half dental surgeons. All 16 candidates were passed, including the three dental examiners, Thomas Bell, John Tomes and Arnold Rogers. The College of Dentists was absorbed into the Odontological Society and the enlarged society changed its name to the Odontological Society of Great Britain. A dramatic event occurred in 1866 when Thomas Evans, the American dentist of Paris,

brought nitrous oxide gas anesthesia and gave demonstrations before the Odontological Society and the staff of the hospital.

In 1874 the society and the hospital were established in a large building in Leicester Square.

The Dentists Act of 1878 provided for the registration of the dental diploma, bringing into being the Dentists Register, to be maintained by the General Medical Council. The Odontological Society relinquished to the newly formed British Dental Association (1879) its political function and confined itself to scientific enquiry and discussion.

In 1900, when the present Royal Dental Hospital of London was built on an adjoining site, the Odontological Society parted company with the hospital and took rooms in the house of the Royal Medical and Chirurgical Society at 20, Hanover Square. Seven years later the Odontological Society expired, to be born again as the Section of Odontology of the Royal Society of Medicine.

▼ Miscellaneous

Beyond the horizon

Kenneth A. Easlick. *J.Michigan D.A.* 38:84-99 Feb. 1956

The first half of this century saw dentistry mature as one of the essential partners in the provision of the nation's health service. In the second half of this century the practice of dentistry will be modified by contributions of the basic sciences, advances in diagnostic technics, advances in clinical dentistry and changes in professional attitudes.

Research in human development shows that the welfare of the structures of the human oral cavity begins with the earliest assumption of life. This newer knowledge of early growth and its contribution to the diagnosis of behavior, the development of occlusion and the origin of oral anomalies, will be applied widely to the clinical treatment of oral conditions in just a few years.

The sciences of anatomy, biochemistry, embryology, histopathology and physiology will be utilized in studying the following: the taste mechanism; alterations in the pattern of swallowing, its inhibitions and its neurologic compensations; the oral protective reflexes such as coughing, sneezing and gagging; oral pain and the changes in the response to pain in aging persons; tactile receptors, proprioceptors and temperature receptors in the oral cavity, and the reflexes which determine mandibular position.

Oral bacteriology will clarify the manner in which microorganisms produce infection. More effective methods will be achieved for the sterilization and disinfection of dental instruments.

Dental caries will be attacked through vaccines, antibiotics, inhibitors of bacterial enzymes and specific anticariogenic nutrients.

The sciences of chemistry, mechanics, metallurgy and physics will develop for dental use materials which will secure impressions that are less susceptible to distortions by undercuts and which use ingredients that can be copperplated directly. New synthetic resins will be developed as restorative materials for anterior teeth. Cobalt-chromium alloys that can be cast for crowns and bridges will be discovered. Amalgams will be made stronger, and a new material to produce hard dies for the preparation of indirect inlays will be discovered.

Pharmacology will provide dentistry with more potent hemostatic agents that do not lose their potency during prolonged storage. Dental x-ray machines will be improved through higher voltages, superior timers and shorter exposures.

Restorative dentistry for young patients may be expected to achieve a high degree of skill. The pedodontist of the future will achieve much of the knowledge of the orthodontist. He will further develop and apply the treatment of interceptive orthodontics.

Drugs will be developed to produce good local anesthesia and analgesia, to avoid postoperative swelling and to prevent bacteremias. Newer, safer agents for general anesthesia and better technics for their administration may lead to a much greater use of general anesthesia in dental offices. Technics for the storage and transplantation of teeth will make the implantation of teeth a common procedure.

More training in orthodontic treatment will be

provided the undergraduate and will be reflected in the practice of the family dentist. Periodontal practice may be modified by research which provides precise information about the deposition of calculus and which develops methods or substances for inhibiting the production of this irritant.

Operational speeds in rotating instruments will vary from 15,000 to 150,000 rpm.

Dentists will develop an increased measure of social consciousness which will project their interests far beyond the restrictive walls of the operating room and the exacting technics performed in an oral cavity. They will feel a greater responsibility for the welfare of the individual and the community. Dental service will be extended through more widespread utilization of auxiliary personnel. Dental education will place greater emphasis on restorative dentistry and interceptive orthodontics for young patients and more emphasis on care for supporting tissues of all patients.

Use of colloidal oatmeal inside rubber gloves

S. William Becker, Jr. *A.M.A.Arch.Dermat.* 71:378 March 1955

Many persons with hand eczema are uncomfortable while wearing rubber gloves even though they wear cotton gloves next to the skin. The accumulated sweat and moist cloth appear to be the main causes of irritation.

Colloidal oatmeal has a soothing effect on the skin, and patients were instructed to dust oatmeal powder on their hands before putting on the gloves. Nine housewives who could not tolerate rubber and cotton gloves were made comfortable by the addition of the oatmeal powder. The hand eczema improved more rapidly after the addition of oatmeal powder to the previous therapy.

Certain persons (jewelers, dentists, and so forth) cannot wear two pairs of gloves, since they must retain the feeling and dexterity in the fingertips. Four such persons tried a variety of powders inside rubber gloves and found that colloidal oatmeal powder made them most comfortable.

No allergic reactions or infections were encountered during this therapy.

Progress in San Quentin program: no. 4

Don Jose F. Aubertine. *J.California D.A. & Nevada D.Soc.* 32:103-104 March 1956

In the spring of 1945 the dental laboratory at the San Quentin state prison in California was placed under the supervision of an advisory committee. For many years the workload of the prison dental staff had been increasing, so that outside of clinic duties little time was left to spend in the laboratory with the inmate technicians. San Quentin is the largest state penal institution in the United States, with a population of approximately 5,000 inmates.

A voluntary committee was selected to serve as advisers in setting up a modern program of dental laboratory procedure. Five dentists and dental laboratory men volunteered, and other men were added to the committee as the program expanded. All served without pay and absorbed the expenses of traveling to and from San Quentin. Almost from the beginning the morale of inmates assigned to the laboratory improved, as did the quality of work. When the program progressed, a full-time laboratory director was secured.

In 1952 the training of the inmates was formalized. Instruction is based on methods employed in licensed laboratories. Inmates become so proficient that they find ready employment in the dental laboratory field when they are released from prison. Rehabilitation is an important by-product of the operation.

With the advancement in technics, modern equipment has been added. As facilities were expanded at San Quentin, other penal institutions were directed to send their prosthetic work to San Quentin for fabrication. The state has saved several thousand dollars through operating the dental laboratory.

In 1954 the San Quentin vocational dental laboratory completed 1,912 complete and partial dentures, acrylic jackets, splints, obturators and cast inlays; in 1955 the total was 2,561. Had the work completed in 1955 been charged for at commercial laboratory rates, the total would have reached $55,536. The cost of materials, supplies and instruction to the laboratory in 1955 was $14,290.56.

Doctoral and Masters' dissertations

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In this column each month are listed recent Doctoral and Masters' dissertations of dental interest, accepted by the dental schools or graduate schools in partial fulfillment for advanced degrees. Copies of many of these theses are available from the schools through interlibrary loan.

A systematic analysis and classification of the dentofacial abnormalities shown in cerebral palsy. *Glenn Edward Jackson. 1955.* M.S.D. *Northwestern University.*

A study of mandibular condylar positions as affected by terminal hinge axis occlusal equilibration. *William Charles Lundquist. 1955.* M.S.D. *Northwestern University.*

A method of testing the susceptibility of bacteria in infections of dental origin to antimicrobial agents. *Edward Patrick Lynch. 1955.* M.S.D. *Northwestern University.*

A study to determine the degree of vitality of the permanent teeth in connection with orthodontic treatment. *Nils Ake Nordh. 1955.* M.S.D. *Northwestern University.*

Investigation of the caries preventive effect of "Ordinal" and its ability to harden dental structures (Untersuchungen über Zahnschutzhärtung unter besonderer Berücksichtigung des Kariesprophylacticums "Ordinal"). *Ernst August Boltes. 1953.* DR.MED.DENT. *University of Bonn, Germany.*

Treatment of inflammatory periodontal diseases with amino acids: a-amino-isovalerianic acid and "Glykokoll" (Die therpeutische Beeinflussung entzündlicher Paradentopathien mit den Aminosäuren a-Aminosoibuttersäure und "Glykokoll"). *Gisela Jütz. 1953.* DR.MED.DENT. *University of Bonn, Germany.*

Is hypercementosis an accompanying symptom of focal infection? (Hyperzementose, eine Begleiterscheinung bei Fokalinfektion?). *Gertraut Bubinger-Rahm. 1953.* DR.MED.DENT. *University of Mainz, Germany.*

A new local anesthetic "A B C" (A B C, ein neues Lokalanästheticum). *Heinz Schöffel. 1953.* DR. MED.DENT. *University of Mainz, Germany.*

Toxicity of local anesthetics after injections into different parts of the body (Die Toxität der Präparate zur örtlichen Betäubung bei Injektionen an verschiedenen Körperteilen). *Erika Emrich. 1953.* DR.MED.DENT. *University of Mainz, Germany.*

Clinical and bacteriologic examinations of the importance of the oral flora (Klinische und bakteriologische Untersuchungen über die Bedeutung der Bakterienflora der Mundhöhle). *Hans Günter Stappert. 1953.* DR.MED.DENT. *University of Mainz, Germany.*

Modern viewpoints in the problem of statics in complete lower dentures (Moderne Gesichtspunkte zum Problem der Statik unterer totaler Prothesen). *Frederico Singer. 1953.* DR.MED. DENT. *University of Mainz, Germany.*

Comparative experimental investigation of the tensile strength of the filling material "Plastémail" during intensive mastication (Vergleichende experimentelle Untersuchungen über die Bruchfestigkeit des Füllungswerkstoffes Plastémail bei Kaudruckbelastung). *Kurt Heinz Ruser. 1954.* DR.MED.DENT. *University of Kiel, Germany.*

The degree of reaction of the periodontium when excessive stress is applied to the teeth (Das Verhalten des Paradentiums bei übermässiger Beanspruchung der Zähne). *Ludwig Schönfeld. 1954.* DR.MED.DENT. *University of Kiel, Germany.*

Experimental investigations of the porosity of self-curing acrylic materials (Experimentelle Untersuchungen zur Porosität der schnellhärtenden Kunststoffe). *Hans Jürgen Streich. 1954.* DR. MED.DENT. *University of Kiel, Germany.*

Experimental investigation of the flexibility and pliability of self-curing acrylic materials in dry and wet condition (Experimentelle Untersuchungen über die Dauerbiegsamkeit des schnellhärtenden Kunstoffs im trockenen und feuchten Zustande). *Walter Münzer. 1954.* DR.MED.DENT. *University of Kiel, Germany.*

Measurements of the capillarity of dental filling materials (Kapillarspaltmessungen an zahnärztlichen Füllungswerkstoffen). *Wilhelm Rose. 1954.* DR.MED.DENT. *University of Kiel, Germany.*

Capillaroscopic observation of healthy and diseased marginal gingivae (Kapillarmikroskopische Beobachtungen am gesunden und erkrankten Zahnfleischsaum). *Rudolf Kabel. 1954.* DR.MED. DENT. *University of Kiel, Germany.*

Experimental investigations of the causes of toxic effects on cells and tissues of vital pulp produced by methacrylic acid methyl ester (Experimentelle Untersuchungen über die Ursachen der toxischen Wirkung des Methacrylsäuremethylesters auf Zellen und Gewebe des lebenden Zahnmarks). *H. Georg Kabel. 1954.* DR.MED.DENT. *University of Kiel, Germany.*

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Contents

Armamentarium

A new removable splint. *Zerosi*.....451
Pramoxine hydrochloride. *Lambert*.....453
Medicated tooth pastes. *Hirt*.....453

Oral surgery

Oral surgery in distoclusion. *Trauner*.....454
Treatment of sialolithiasis. *Travin*.....456
Cheilotomy for pseudocheilia. *Rafel*.....456
Drainage of edemas. *Schaeffer*.....457
Adamantinoma. *Holdsworth*.....457
Enlarging roentgenograms. *Rendón C.*.....458
Dental extractions. *González Methol*.....459
Complete odontectomy. *Redish*.....460
Anesthesia for infants. *Steffensen*.....461
Fear and anesthesia. *Hamilton*.....461
Anesthesia in the office. *Austin*.....462
Chondrosarcoma of maxilla. *Paterson*.....462
Congenital epulis. *Hankey*.....463
Cancer of floor of mouth. *Rahausen*.....464
Cyst in the upper jaw. *Krebs*.....464
The cleft palate child. *Ricketts*.....465

Periodontics and endodontics

Treatment of periodontal diseases. *Kluczka*..466
Histopathology of pulp. *Sauerwein*.....467
Bacteriologic control. *Maisto*.....468

Preventive and public health dentistry

Outline of dental caries. *Slack*.....469
Prevention of dental caries. *Leimgruber*....470
Use of fluoridated milk. *Ziegler*.....471
Teeth and politics.....472
Caries and socioeconomic status. *Savara*....472
Central Australian aborigines. *Cran*.....472
Phosphatases and caries. *Carter*.....473
Solubility of dentin in water. *Crabtree*.....473
Fluoridation and politics. *Nylund*.....474
Calcium and phosphorus. *Chattas*.....474
Dental health education. *Michel*.....475
Mouth protectors. *Schoen*.....476
Dental health campaign. *Hastilow*.....476
Statistical reliability. *Rantanen*.....477
Standardizing caries statistics. *Baume*.....478
Distribution of cavities. *Parfitt*.....478
Iowa dental health education. *Grabow*.....479

Orthodontics and pedodontics

Direction of tooth eruption. *Brückl*.....480
Nylon in orthodontics. *Roberts*.....482
Teething process. *Dubois-Prevost*.....482
Preserving deciduous teeth. *Ascher*.....483
Teeth and body growth. *Pittorru*.....484

Basic science

Epithelial attachment. *Ussing*.....485
Connective tissue. *Skuzkij*.....486
Reticular dentin. *Boucquet*.....487
Growth of glenoid fossa. *Scott*.....487

Reduction tendency. *Rantanen*.....488
Fossil research. *Plumb*.....489
Health of the Hunzas. *Müller*.....489
Furred tongue. *Loudon*.....490
Malformations in man. *Büchner*.....491
Diagnosis of poliomyelitis. *Wilde*.....491
Dwarfed teeth. *Martínez Cano*.....492
Bowen's disease. *Lindemann*.....492
Cancer of the mouth. *Hitchin*.....493
A new antibiotic. *Martin*.....493
Positions of lower jaw. *Sicher*.....494
Avitaminoisis B_1. *Vorovskii*.....495
Salivary calculus. *Everett*.....496

▼

Prosthetic dentistry

Staining denture bases. *Johnson*.....497
Double impression technic. *Stahl*.....498
Role of cephalometrics. *Ricketts*.....499

▼

Operative dentistry

Notes on gold fillings. *Hattyasy*.....500
Effects of cement fillings. *Kleefeld*.....500
Case for gold foil. *James*.....501
Danger of overtreatment. *Schwartz*.....501

▼

Professional activities

Establishing just fees. *Dodd*.....502
Practice administration. *De Santis*.....502
Dental fatigue. *McAllister*.....503
Federation of Technicians. *Warrington*.....504
Dentist and civil defense. *Hassan*.....504
Odontological Society. *Henry*.....505
Future of dentistry. *Easlick*.....506
Use of oatmeal powder in gloves. *Becker*.....507
Dentistry in San Quentin. *Aubertine*.....507

▼

Doctoral and Masters' dissertations

Dissertations 508

Index of authors

▼

Ascher, P. 483
Atkinson, H. F. 473
Aubertine, D. J. F. 507
Austin, John C. 462

Baume, Louis J. 478
Becker, S. W., Jr. 507
Boucquet, M. A. 487
Brückl, Hans 480
Büchner, F. 491

Carter, W. J. 473
Čelešnik, F. 454
Chattas, A. 474
Crabtree, Muriel G. 473
Cran, J. A. 472

De Santis, A. J. 502
Dodd, Lloyd H. 502
Dubois-Prevost, R. 482

Easlick, Kenneth A. 506
Englander, H. R. 473
Everett, Frank G. 496

Geraci, Joseph E. 493
González Method, J. 459
Grabow, Elvira L. 479

Hamilton, E. E. 461
Hankey, George T. 463
Hassan, A. A. 504
Hastilow, F. J. 476
Hattyasy, D. 500
Heilman, Fordyce R. 493
Henry, C. Bowdler 505
Hirt, Christina 453

Hitchin, A. D. 493
Hoerman, Kirk C. 473
Holdsworth, W. G. 457

James, Allison G. 501
Jillson, Otis F. 453
Johnson, H. B. 497

Kleefeld, Eleonore 500
Kluczka, Josef 466
Krebs, F. 464

Lambert, Lewis H. 453
Leimgruber, Ch. 470
Lindemann, A. 492
Loudon, I. S. L. 490

Maisto, Oscar A. 468
Martin, William J. 493
Martínez Cano, José 492
McAllister, K. 503
Michel, Gottfried 475
Mühlemann, Hans R. 453
Müller, Walther 489

Nichols, Donald R. 493
Nylund, H. W. 474

Parfitt, G. J. 478
Paterson, W. 462
Pittorru, Quirico 484
Plumb, Robert K. 489

Rafel, S. Stephen 456
Rahausen, Alberto 464
Rantanen, A. V. 477, 488
Redish, Charles H. 460
Ricketts, R. M. 465, 499
Roberts, G. H. 482
Rendón C., J. R. 458
Rowe, N. L. 457

Sauerwein, Ernst 467
Savara, Bhim Sen 472
Sayago, Carlos 464
Schaeffer, H. 457
Schoen, Gerard H. 476
Schwartz, L. Laszlo 501

Scott, James H. 487
Shklair, Irving L. 473
Sicher, Harry 494
Skuzkij, M. A. 486
Slack, Geoffrey L. 469
Stahl, Ewald 498
Steffensen, W. H. 461
Suher, Theodore 472

Trauner, R. 454
Travin, Milton S. 456
Trexler, V. H. 461

Ussing, Marie J. 485

Vorovskii, E. V. 495

Warrington, W. A. 504
Wellman, William E. 493
Wilde, W. 491

Zerosi, Carlo 451
Ziegler, Eugen 471

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